

TVP Animation Pro 8.5

User Guide



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- *Running-Kid* (lesson 5, 6, 12, etc ...) was created by Alain Charrier and animated by Raymond Gourrier.
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- The red planet, the tree, the prehistoric, the house, the flowers paintings, the color picker, the photos and various diagrams were created by Fabrice Debarge.
- All other images (screenshots, panels, ...) are protected by copyright of TVPaint Développement.

Many thanks you to all those who have helped us from close and far to complete this task.

Lesson 00

Introduction

Getting to know TVPaint Animation Pro

TVPaint Animation Pro is a program compiled for graphic design and 2D animation. This program is intended for drawing and animation enthusiasts. With its bitmap approach, its objective is to cover the main needs of the artist. It offers a complete range of high-performance tools, the parameters of which may be set, whether for the layman or the professional artist and yet still offers the creative feeling provided by pen and paper.

TVPaint Animation Pro is the animator's home studio.

Based on TVPaint technology, which is renowned worldwide since its success on the Amiga in 1991 and constantly upgraded for ever better performance, TVPaint adapts to all production diagrams, whether traditional, fully digital or hybrid.

Designed to work with all resolutions, it will delight all drawing enthusiasts thanks to its tools which offer limitless possibilities. Your creations are only restricted by the boundaries of your imagination !

Typographic conventions

In order to simplify understanding of the techniques described, this user guide uses the following typographic conventions :

- *Italics* : the names of menus, buttons, tabs, windows, commands, tools (all elements referring to one of the objects present in the program) are written in italics.
- [key] : designates a keyboard shortcuts.
- [key1+ key2] : designates a key combination. Keep the first key pressed and then press the second key.
- left click / right click (LMB, RMB) : these shortcuts refer to a click on the left or right mouse button.

As you are advancing in the guidebook, you will encounter the following symbols:



TIP

A symbol representing a light bulb indicates tips and hints for using the program.



Remark

A symbol representing a warning sign emphasises information that requires particular attention and indicates an important comment.



Reminder

The reminder symbol characterises any information the explication of which was already given in the guide book.

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Lesson 1

First approach of TVPaint Animation Pro

In this lesson you will:

- Learn to open and close TVPaint Animation Pro.
- Discover the various panels and windows.
- Start a project.
- Access InLine help.
- Set your preferences.

After having followed the installation instructions in the Start-up guide, you may now start *TVPaint Animation Pro*. To do this, proceed as follows:

- * Double-click on the desktop icon or use the start menu (for Windows users).
- * Double-click on the applications folder icon or dock icon (for Mac OS X users).

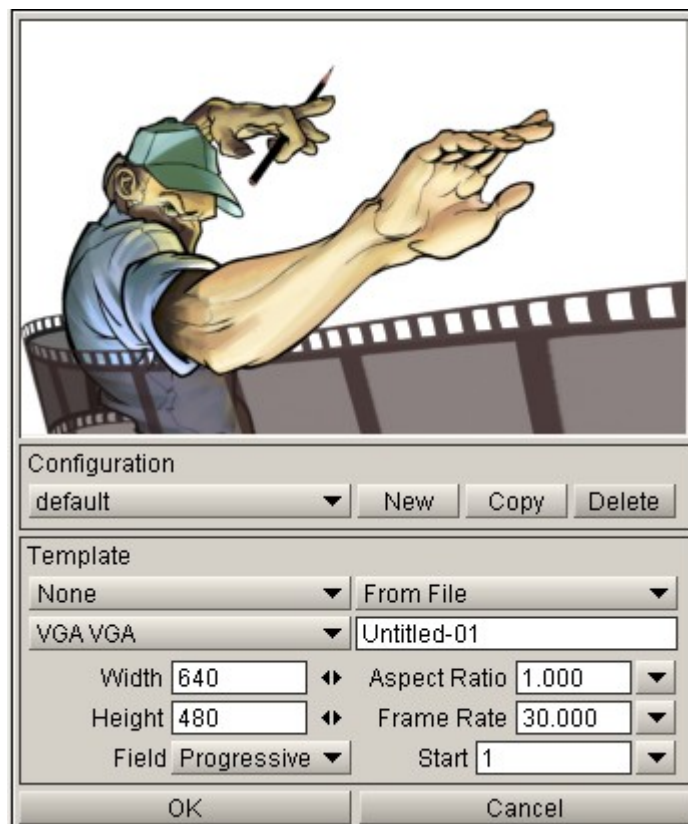
The *TVPaint Animation Pro* program and most of the associated files are saved in the «program» directory of your operating system.

To use *TVPaint Animation Pro*, you may choose between the mouse or stylus.

The latter is more appropriate for persons wishing to have that « freehand » design feeling.

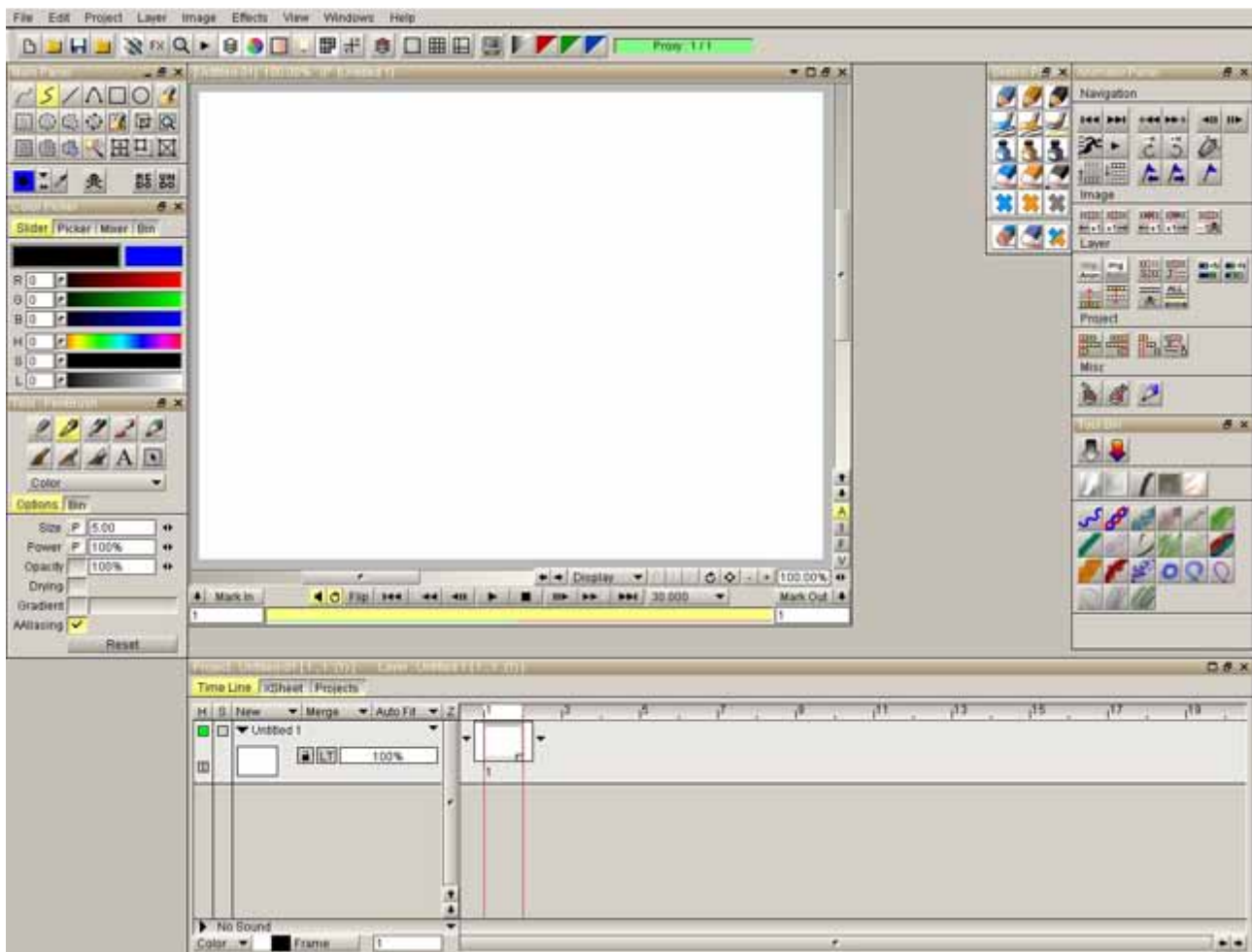
The various program panels

When the program is started, the following screen appears. This screen enables selection of your future workspace and managing all your configurations.



The various options available on this screen will be discussed in further detail elsewhere in this lesson. For the moment, simply click on **OK**.

Once the program has loaded, the following image illustrates what your screen will be like for a display resolution of 1280 x 1024 pixels.



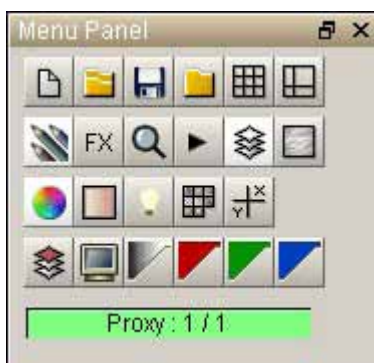
Here you will find a description of the various panels displayed on the screen.

The toolbar



The first icons on this toolbar concern the traditional functions found in all standard software packages: *New* (start a new project), *Load* (load an existing project), *Save* (save a project), *Close* (close the current project).

The following icons are used to open or close various TVPaint Animation Pro panels (display coordinates, light table, timeline, etc.).



To move the toolbar, click and hold the left mouse button, then slide the cursor as required. The toolbar then appears in the form of a panel.

Main panel



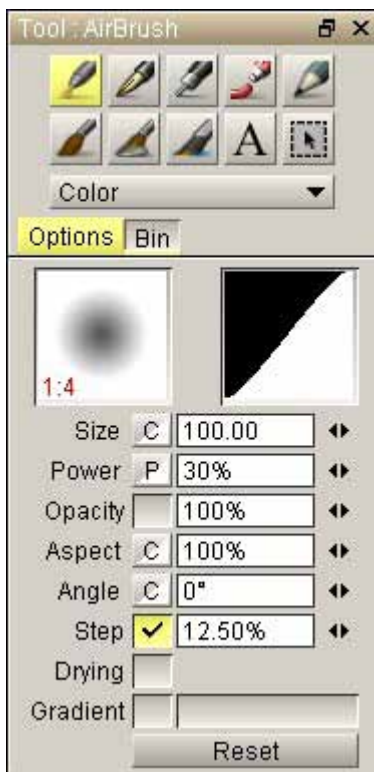
This panel is used to draw segments, ellipses, rectangles, curves,... Brush selection and cutting options are also available here.

Color picker



This panel is used to select the color in which you wish to work. Distinction is made between the *A color* (always referred to as main color) in the left rectangle and the *B color* in the right rectangle.

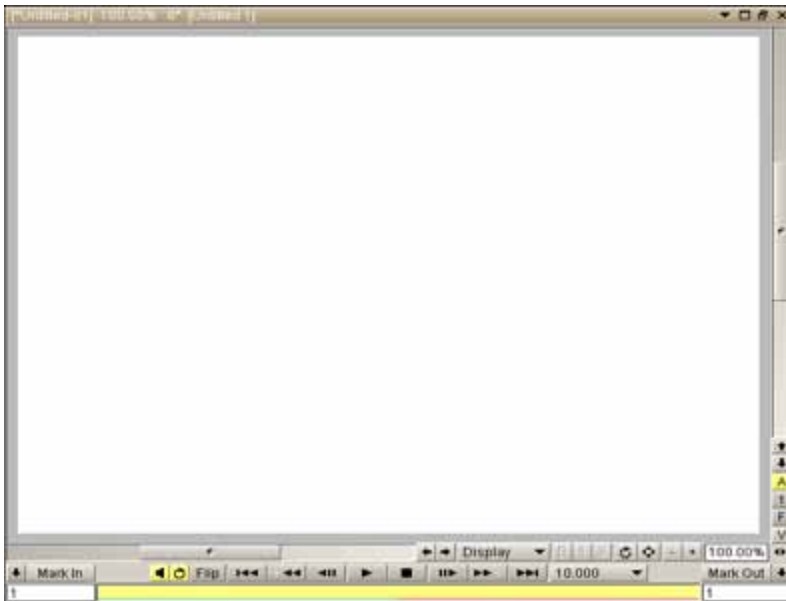
Toolbox



The toolbox contains a wide choice of buttons corresponding to traditional drawing tools: airbrush, brush, pencil, wet brush, etc.

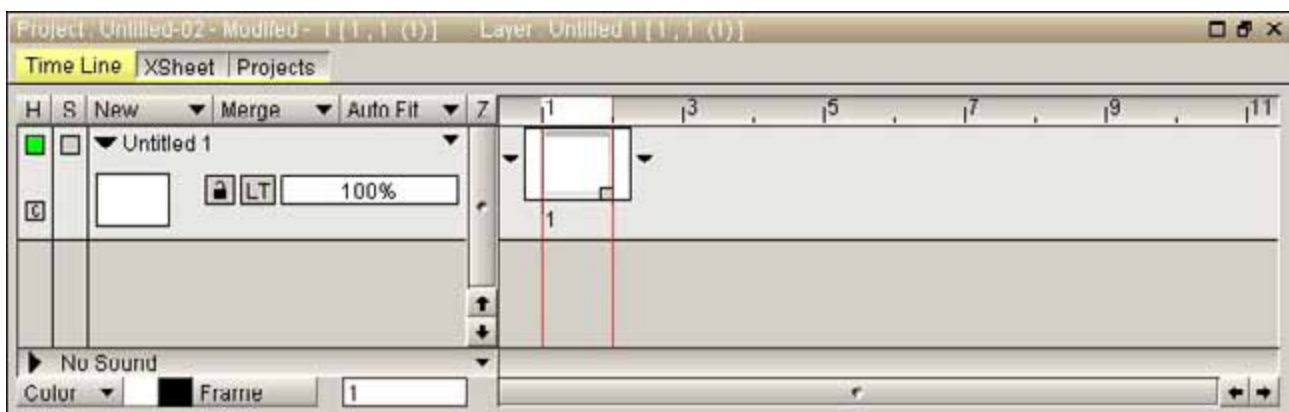
Various parameters may be set: size, power, opacity, etc.

Current project window



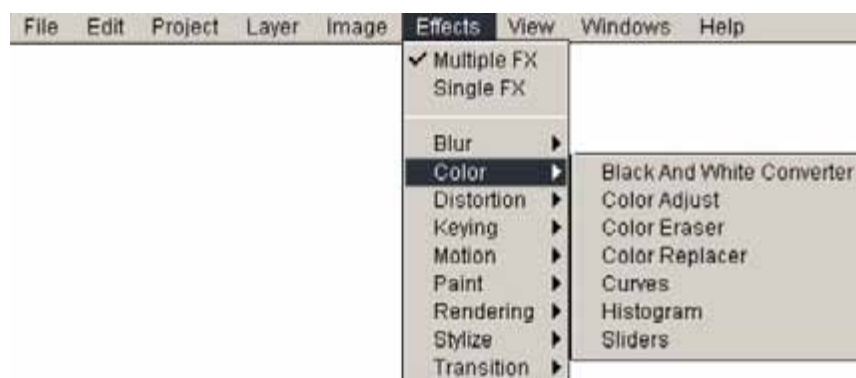
The current project window is the one in which you will be able to express your artistic talents and create a wide variety of animated sequences.

The layers window



This window is also referred to as the «timeline» by many users. It is used to manage your layers and insert keys for your effects (we will discuss this point in subsequent lessons).

Main menu



TVPaint Animation Pro has numerous menus located just above the toolbar in windows (they are located at the top of the screen on Mac OS-X) : *File, Edit, Project, Layer, Image, Effects, View, Windows, Help*.



Each of these menus offers specific options all of which will be described in detail in this guide.







Some useful tips


Move a window

If for some reason you wish to move a window, this is done by simply clicking on the title bar and then sliding it to the required location while keeping the mouse pressed.

Close, minimize or maximize a window

These three buttons, on PC :  and on Mac : , are present on many of the panels and windows, in the top right-hand corner for PC and top left-hand corner for Mac.

- * The buttons  /  close the window (keyboard shortcut [Shift+W]).
- * The buttons  /  place the current window in front of or behind other windows.
- * The buttons  /  are used to minimize the window.

Once minimized, this icon changes to  and may be used to maximize the window again (note that this icon does not change on Mac).

The size of some windows, the timeline for example, may be adjusted: it is possible to adjust their size with precision by clicking on one of the edges.

Sliders and mini-sliders



The element above on the left is referred to as a slider. It is located horizontally under some windows (in particular under the current project window) or vertically next to these windows. Click on the arrows with the left mouse button or slide the rectangle to view the content of the window with which the slider is associated, either up and down or left and right.

As you have already guessed: the element on the right is a mini-slider which may be used to change the numeric value or percentage next to it with a left click and slide of the mouse on the double arrow.



When sliding the mouse on a mini-slider, press and hold the right button to accelerate movement.

Alphanumeric fields



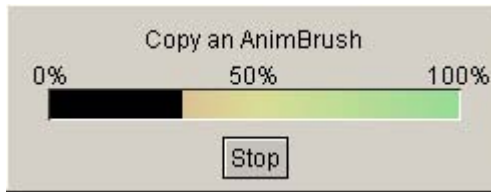
Each time you rename a layer, project, effect or other element, you will be asked to enter a text in this type of window. Click on *OK* to confirm the name change or click on *Cancel*.

The standard keyboard shortcuts:

[Ctrl+X] (cut), [Ctrl+C] (copy), [Ctrl+V] (paste), [Ctrl+A] (select all), [Ctrl+Z] (cancel) are valid in all alphanumeric fields (note that these shortcuts are valid for PC and on Mac computers the user presses the Apple key instead of « Ctrl »).

When required they are accessible with a right click on the concerned field.

Progress bar



Sometimes application of an effect with TVPaint Animation Pro requires a certain amount of processing time. If your computer is carrying out such an operation, the progress bar appears to inform you of the progress of this operation.

If required, the [Esc] key on Windows, [⌘] on Mac OS-X or *Stop* button may be used to stop the operation in progress.

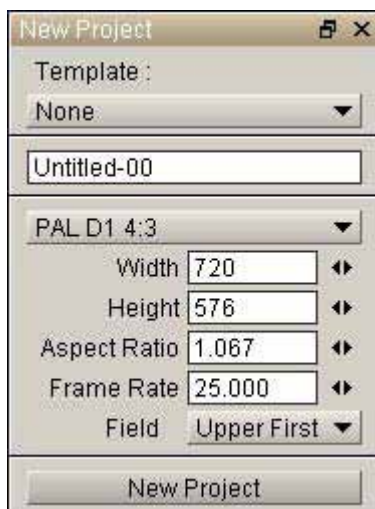
Working with projects

TVPaint Animation Pro works with *Projects* which contain the artist's creations. The notion of project is vast and further details will be provided during the firsts lessons.

Create a new project

The first thing to do when using this program is create a new project.
To do this, you may:

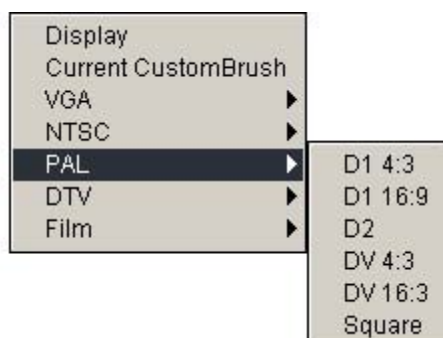
- * Select the parameters of your new project as soon as the program is started when the start-up screen appears.
- * Use the *File* main menu.
- * Use the keyboard shortcut [Shift+N].
- * Click on the first icon to the left on the toolbar.



A panel then appears (see opposite).
This panel is used to define:

- * The *name* of your project
- * Its *Width* and *Height* in pixels
- * The *Aspect ratio*
- * The *Frame Rate (Images/sec.)*
- * The *Fields* display mode

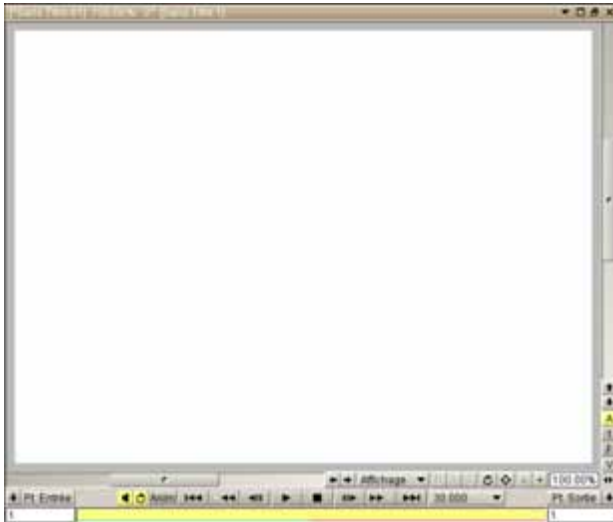
The *Template* concept will be discussed in lesson 5.



Setting each parameter to create an animation in the format of your choice may prove long and arduous. Therefore, a popup menu has been added to the panel to allow you to set the various numeric fields according to the most commonly used formats: PAL, NTSC, VGA, DTV, Film, etc.

TVPaint Animation Pro uses all standard formats (even very high definition) both for image width/height ratios 4/3 and 16/9 as well as others.

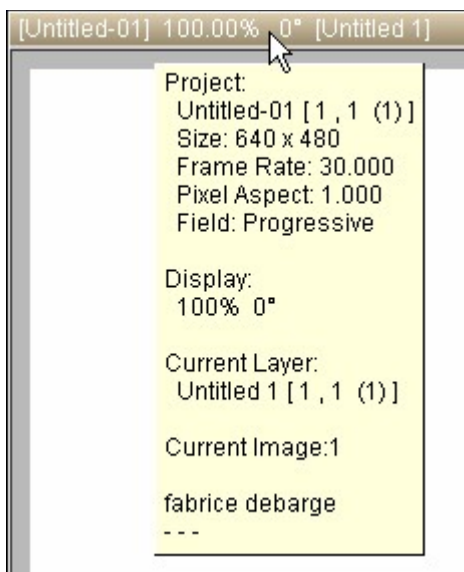
Once all options have been selected, click on *New project*.
A project window then appears on the screen (see below).
It is in this window that you will work and view your creations.



TVPaint Animation Pro allows you to work on several projects at the same time.

The maximum number of projects is limited only by the capabilities of your computer.

View data relative to your project



To view data relative to your current project (size, frame rate, ratio, etc ...), simply move the cursor over the title bar and hold it there.

A small yellow window then appears with all the information you require.

Name a project

The default name for a new project is «Untitled-00 », « Untitled-01 », « Untitled-02 », etc ... To render these names more understandable, it is possible to rename them as you wish.

To do this, simply use the *Project>Rename* main menu.

Working with several projects

TVPaint Animation Pro offers the user the possibility to work with several projects on the screen at the same time. The [Tab] key on your keyboard may be used to switch from one to the other. It should be noted that the names of the projects present on the screen may be viewed in the *Windows* main menu. The checked name is the current project.



Working in fullscreen mode



It is also possible to work in *Fullscreen* mode by simply pressing the [V] key on your keyboard or by clicking on the toolbar icon indicated below.

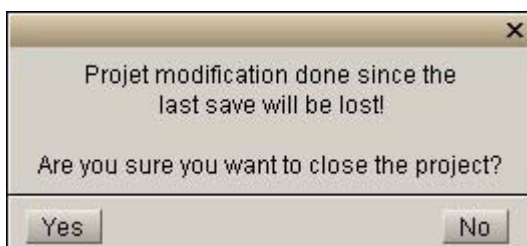


When in *Fullscreen mode*, the keys of the numeric keypad may be used to move your project on the screen. In fullscreen mode, the [F12] key allows to hide all the tool panels. Here again, the [Tab] key is used to switch from one project to another. To return to windows mode, simply press the [V] key or the icon above again (these options are also accessible via the *View* main menu).

Close a project

A project may be closed in four ways:

- * Use the  /  buttons at the top of your project window.
- * Use the fourth button from the left on the toolbar.
- * Use the *File > Close project* main menu.
- * Use the keyboard shortcut [Shift+W].



In order to avoid any mistakes, a confirmation message will appear (see opposite).

The *Help* main menu

Each menu proposes specific options. At this stage we will take a closer look at the *Help* menu.

InLine support

At any time, a help function referred to as *InLine help*, is available in TVPaint Animation Pro. Move the cursor over the icon for which you wish to obtain information (without clicking on it) and a brief description of the icon you are pointing at will appear together with any associated keyboard shortcut.



Opposite you will find the description corresponding to the *Floodfill* tool.

If you wish to reduce the content of the InLine help or prevent it from appearing on the screen entirely, the corresponding options are available in the *Help* menu.

The *About...* window



This section provides information about the program :



- * name of developers,
- * beta-testers,
- * date of creation,
- * serial and license number,
- * copyrights.

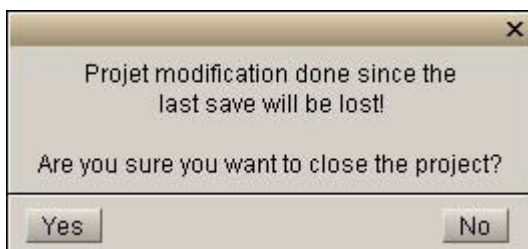
The *Check for Updates* option

This option allows to check directly on the TVPaint Développement website if there is an update for your software. If your version is outdated, you will be allowed to download the latest version. *Lock* and *Unlock* codes are needed to perform this operation.

To quit the program

We will now quit the program. To do this you may:

- * Click on the *Close* button at the top of the screen  (PC) or  (Mac)
- * Select main menu *File > Quit*.
- * Use the keyboard shortcut [Shift+Q]



The confirmation window opposite then appears.

Save the configuration

At this point, if you wish to keep the current layout of panels on the screen for the next time you open TVPaint Animation Pro as well as the effects, palettes and various settings used (this list will be completed as the lessons progresses ...), tick the *Save this configuration* box.

You may then choose to:

- * *Leave* TVPaint Animation Pro, or.
- * *Stay* and return to the TVPaint Animation Pro interface.

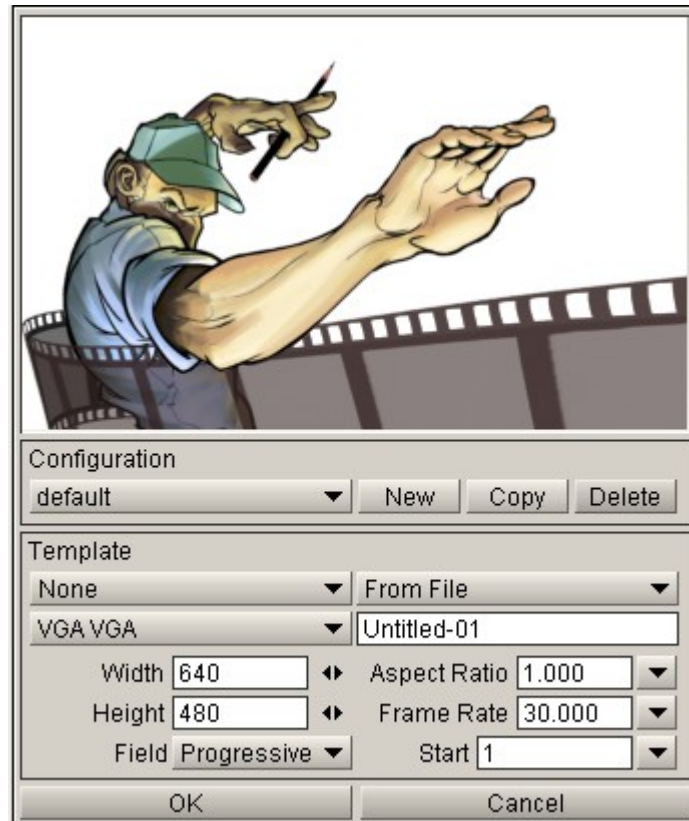
Managing the configurations

A configuration contains a lot of useful informations like the layout of panels, the interface colors, the palettes, etc ...

You certainly guess it : it is possible to create several kind of configurations :

For exemple : a configuration adapted to dual-screen computer, a configuration adapted to HDTV, another one with other interface colors, etc ...

The current configuration can be saved when you quit the program. The starting panel of the program allows you to manage the configurations.



When restarting TVPaint Animation Pro, the user may either create, copy or delete a configuration (you can also select their storing folder).

* To create a new configuration, click on the dedicated button in the window which first appears when the program is started (see below).

* To duplicate an existing configuration, click on the *Copy* button in the same window. A text window will appear. You may enter the name of the duplicated configuration in the text field and then validate it by clicking *ok*.

* When a configuration is deleted, all effects, brushes, palettes, shortcuts... used previously will be lost. Of course, if you saved them in advance, you can reload and re-use them.



By default, the configurations are located in the folder :

- **C:\Documents and Settings\your_name\Application Data\TVpaint Animation**
for Windows users
- **\$ Home Directory/Library/tpaint animation pro/default**
for Mac OS-X users

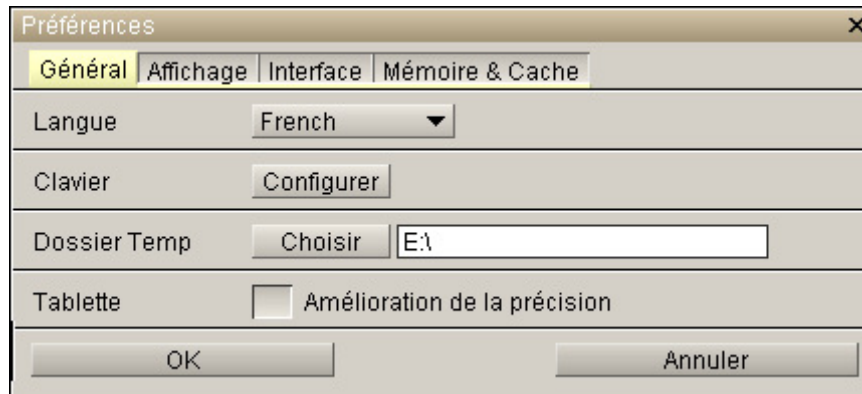
The *from file* popup menu allows you to start the software by loading one of the ten previously used project.

The Preferences panel

The *Preferences* panel is accessible via the *Edit* main menu. This function is used to set various user options which enable re-organisation of the interface.

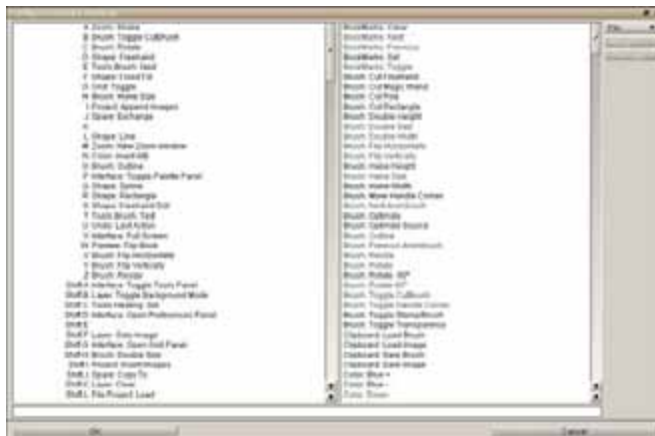
It comprises four tabs: *General*, *Display*, *Interface*, *Memory & Cache*.

The General tab



The *General* tab indicated above comprises four sections for a PC and three for a MAC.

- * The first is used to select the HMI language. At present, the user may choose between French and English.
- * The second section is used to attribute keyboard shortcuts to almost all icons and menu options.



To create your own shortcuts, click on the *Configure* button in the second section.

The window opposite then appears.

You have probably noticed that when the InLine help appears, many tools, options, drawing modes, etc. already have associated keyboard shortcuts.

- The left-hand column indicates all keyboard keys and key combinations with the associated functions when attributed.
- The right-hand column indicates all TVPaint Animation Pro functions which may be attributed to a keyboard shortcut.
- The *Assign* button is used to assign a function to a specific key or combination of keys (in which case you will create a shortcut for this function). The combination [Ctrl] + *Assign* is used to add a function to a key. The various functions will be executed in the order they were added.
- The *Unassign* button has the opposite effect (in this case it deletes the shortcut).
- The *File* popup menu is used to save the *keymap* on your hard drive, load an existing keymap, clear the current keymap or reset the default keymap.

- * The third section of the *General* tab is used to define a temp directory in which temporary TVPaint Animation Pro files may be stored.
 - This directory may be modified using the associated text field or using the *Set* button (a file navigator window then opens).
 - The temporary files contain data relative to the current TVPaint Animation Pro session. Data relative to your animations is also stored here (for example, the various stages of your work necessary for correct operation of the *Undo* and *Redo* options).
 - Inexperienced users are advised not to change the default location.



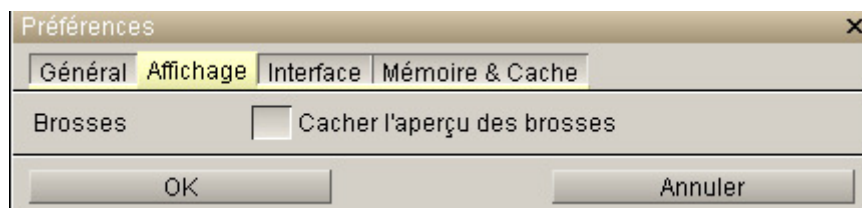
The faster the data storage device on which your temporary files are stored, the faster TVPaint Animation Pro will work. Always ensure this storage device has sufficient available storage capacity.

- * The fourth section of the *General* tab (specific to PC users) is used to enable or disable the *Sub-Pixel* mode for future drawings. This is in direct relation with your hardware and, more precisely, with your graphic tablet if you are using one (we strongly recommend it!).

All the latest models of Wacom tablets work in Sub-Pixel, i.e. the tablet precision is greater than one pixel on the screen. Enabling this function when suitable hardware is used will allow you to use TVPaint Animation Pro drawing tools with a precision greater than one pixel !

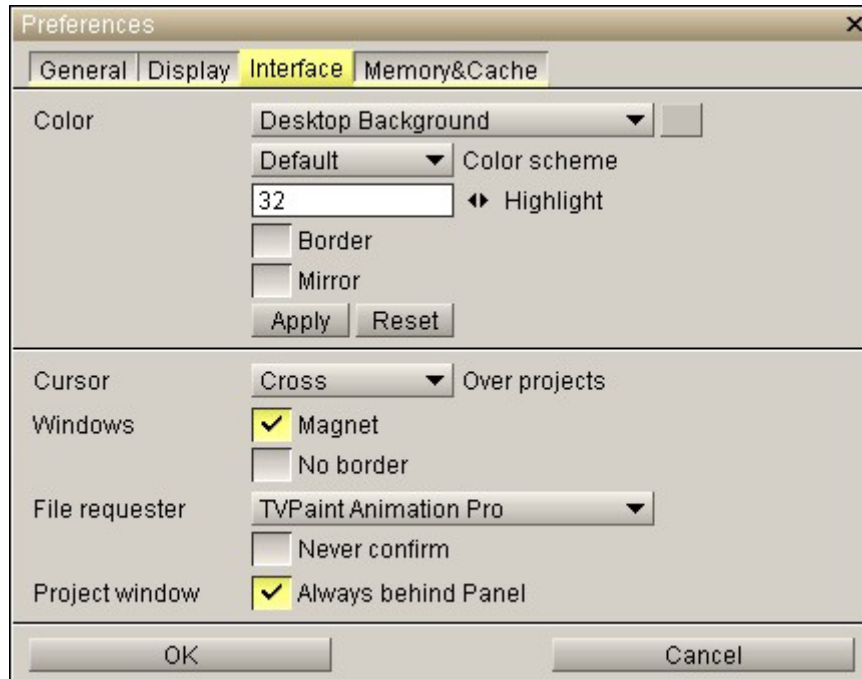
In the contrary case, if your hardware does not support this function, tablet management may be negatively affected (drift between the true position and the position of the cursor on the screen, for example) and will deliver results considerably different to those expected, in particular if you work with a platform of the TabletPC type or in double-screen configuration. We therefore recommend you check the compatibility of your hardware to benefit fully from this function.

The *Display* tab



The *Display* tab concerns brush display (the latter will be discussed in detail in lesson 4). The *Hide brush* button is used to mask the brushes when they are used as drawing tools. Only the mouse cursor remains visible on the screen and a frame indicates the exact location of the brush. This option is sometimes practical when working on a computer with limited resources: the use and display of large brushes may slow the computer down.

The *Interface* tab

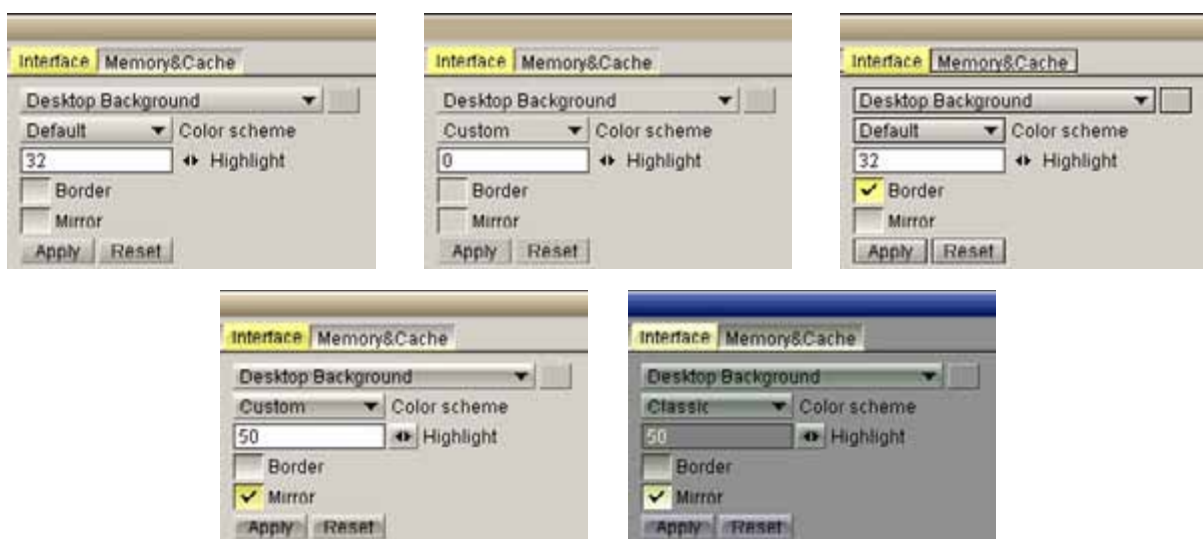


* The first section of this tab may be used to modify the program interface colors.

The default colors used in TVPaint Animation Pro are light gray in order not to interfere with the colors used in your projects. However, you are of course free to modify these colors as you wish.

- The first popup menu allows you to select the element for which you wish to modify the color (buttons, text selected, sliders, etc.)
- Next to this field you will find a square box indicating the display color of the interface element selected. Simply click on this box and then select any color on the screen to be assigned to this element.
- The *Color scheme* popup menu is used to quickly select a set of predefined colors or the default color scheme for this interface.

* The *Highlight* mini-slider, the *Border* and *Mirror* options allows to have a new gradient look.

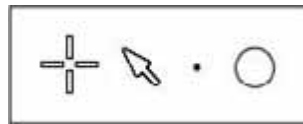


* The *Save* and *Load* options allows to share the interface settings.

* The *Reset* button is used to return to the colors present when your configuration was loaded.

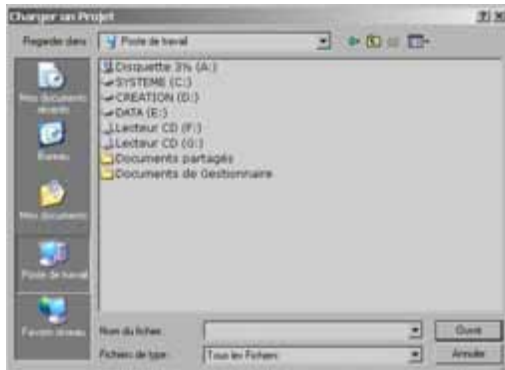
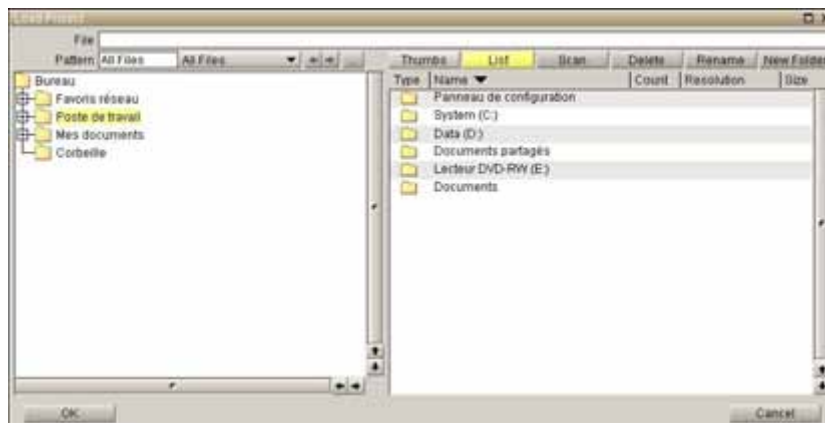
* The *Apply* button applies the colors selected to your current interface.

* The second section allows you to choose the *Style* of your cursor. The different possibilities are: cross, arrow, point or circle as illustrated opposite.



* The third section is used to *Magnetize the various windows of your interface*. This renders management of their movement more practical. You may also choose to display the program without tool or title bars (for windows users), which increases the project working zone.

* The fourth section is used to select which type of file requester is to be used. Below you will find examples of TVPaint Animation Pro specific as well as standard Windows and Mac OS X file requesters.



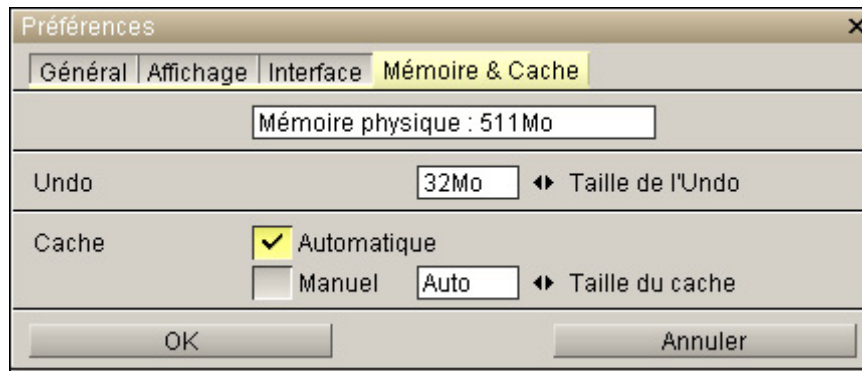
The TVPaint Animation Pro file requester is common to many software packages developed by TVPaint Développement and is present in your program regardless of your specific operating system.

It is the only one capable of displaying previews for files with extensions .TVP .MIR .AUR .DIP.

The *Never confirm* button, when ticked, cancels the confirmation request which normally appears when a file is deleted or rewritten.

* The last section contains a tick box used to place the current project windows behind the other interface panels.

The *Memory & Cache* tab



This tab first displays the physical memory available on your computer.

* Just below this field you will find a numeric field and mini-slider next to it. This field is used to attribute the amount of memory you require for the *Undo* option which allows you to «return» to and undo the previous steps when drawing on the screen. The higher this value, the «further back» you may go. However, this default value is largely sufficient.

* TVPaint Animation Pro uses the physical memory of your computer and one or several temporary files as discussed in the *General* tab.

You may want to allow TVPaint Animation Pro to manage this function automatically or impose a maximum cache size to be used (this may be useful if you are working simultaneously with several programs demanding a large storage capacity).

With regard to this point, it should be noted that TVPaint Animation Pro manages operating systems using over 3 Gigabytes of physical memory.



To save your shortcuts, colors or other predefined preferences for later use with TVPaint Animation Pro, do not forget to save your configuration before quitting the program.

Some details

Creation of a new project requires some additional explanations which you will find below:

Working without the notion of DPI

You may already be used to the notion of DPI (dots per inch).

The DPI is a pixel density unit often used in imaging and printing software packages. The higher the DPI value of an image, the more pixels it contains and the sharper the printed image will be.

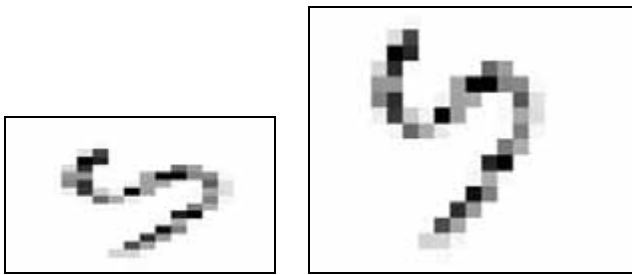
In the animation field, the measurement used is the pixel. The notion of pixels is more practical as it adapts to the specificities of both metric and non-metric systems.

For example: the European PAL format uses a resolution of 720 pixels in width and 576 pixels in height, whereas the American NTSC format uses a resolution of 720 pixels in width and 486 pixels in height.

The global size of your animation in centimeters, meters or inches depends entirely on the TV or cinema screen used to view them.

The notion of pixel aspect ratio

The pixel aspect ratio is the multiplication coefficient which links the pixel width to the pixel height. Depending on the video formats, the pixels may be either square or slightly rectangular.



Left: (pixel width) = (pixel height) x 2.
The ratio is therefore « 2 ».
Right: (pixel width) = (pixel height).
The ratio is « 1 » and the pixels are square.

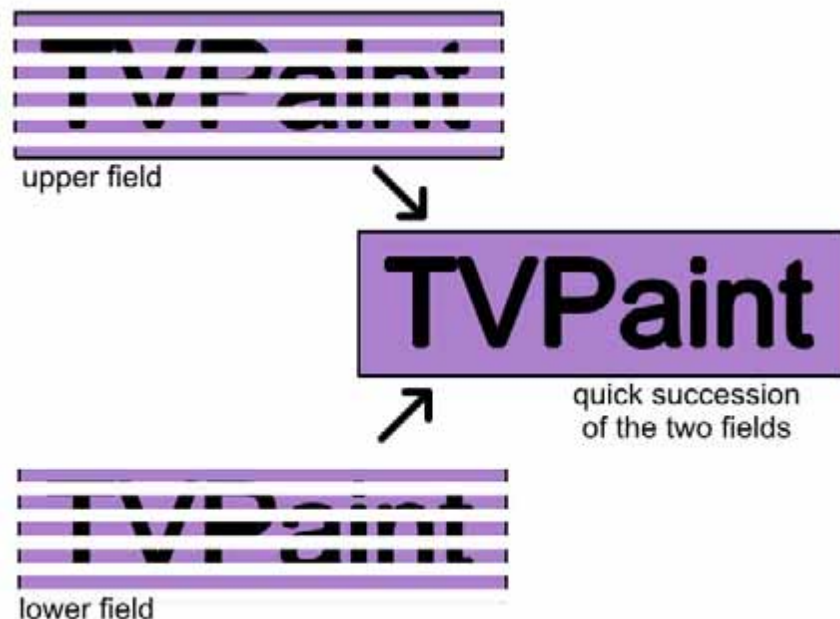
The pixel aspect ratio has a value of 1.067 for the PAL format and a value of 0.9 for the NTSC format.



Avoid confusion between pixel aspect ratio and width/height ratio of a video (4/3, 16/9, ...). The ratio is the width/height ratio of the pixels.

Video fields

Normally, a video image is composed of two fields which alternate at a speed which is too fast for the human eye, these fields are referred to as upper fields and lower fields. A field is a vertical half-resolution image which contains every other line of the image. Interlacing of these fields is linked with the PAL, SECAM and NTSC standards. In PAL/SECAM, the upper fields appear first, whereas in NTSC it is the lower field which appears first.



This framing technique, even if twice as many images are required for the same video (50 instead of 25 images per second in PAL mode), has been adopted in order to improve the quality of image movement and precision. Taking advantage of the persistence of vision effect, it also allows the user to work with lower resolutions.

The use of video formats with fields is possible in TVPaint Animation Pro.

When creating a project, it is therefore necessary to indicate which of the two fields will be displayed first using the *Fields* popup menu.

The option *None* in this menu is used to create a project without using fields.

Lesson 2

Drawing basics

In this lesson you will:

- Learn how to handle the various tools: airbrush, penbrush, wetbrush, pencil, mechanical pencil.
- Discover the various facets of the color picker.
- Draw simple geometric forms and floodfill surfaces.
- Study the notions of opacity and transparence of a pixel.
- Study the notions of "colored background" and layers.
- Use the different drawing modes.

It is very easy to draw using TVPaint Animation Pro.

In this second lesson we will draw a small house (very simple) using TVPaint Animation Pro's tools. In this way we can study the basics which will allow you to express your artistic talents.

Even if it is possible to draw with a trackball or mouse, it is strongly recommended to use a graphic tables equipped with a stylus. This tool requires getting used to for beginners but it is much more natural to use for drawing.

Your first drawing

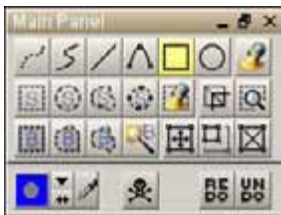
The first geometric form: draw a rectangle

Once the program is started, proceed as follows: open a project in « PAL square » format.



Click on the *Penbrush* icon on the *Tools panel* (as soon as the tool is selected, the icon turns yellow to indicate that the tool is chosen, see image opposite).

Then adjust the size of the penbrush to 1.5 pixels in diameter.



Select the *Rectangle* icon on the *main panel* by clicking on it once. Again, the color of the icon changes from gray to yellow once the selection is made.

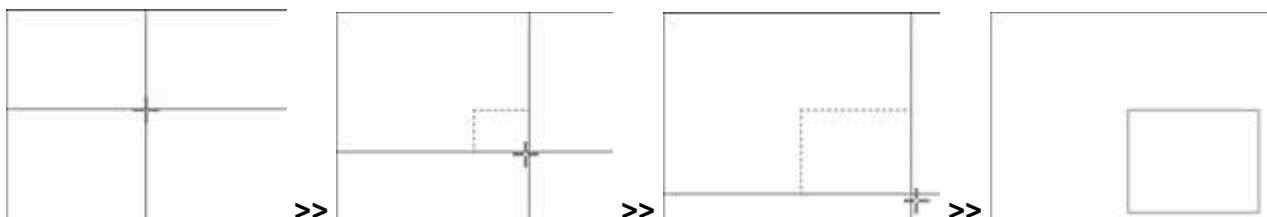
This applies to almost all icons in this application.



Select the *Bin* tab of the color picker and choose a gray color (if necessary, use the slider to get there).

After having clicked on the desired color (or pointed to it if you use a graphic tablet) this color will appear in the main panel and in the color picker as *main* color or *A* color.

Click on the center of the image and, without letting go of the mouse button, slide it towards the bottom right hand corner. Release the mouse button. A gray rectangle has now been drawn in the current project window (see diagrams below).

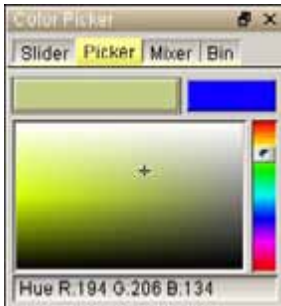


The *Floodfill* option

We will now floodfill this rectangle with color.



Select the *Floodfill* option in the *main panel*.



Go to the *Picker* tab of the color picker panel and choose a color as in the diagram opposite: a gray color with a slight yellow hue. The choice of this color is important for the continuation, in particular for studying the drawing modes. You will notice that the RGB information is indicated at the bottom of the panel, you can try to get as close as possible to them.



A right click on the same window enables the choice of other ranges, the colors of which vary according to hue, luminosity and saturation or according to the intensity of the colors red, green and blue.



Now click inside the rectangle in the project window and you will obtain the result shown opposite.

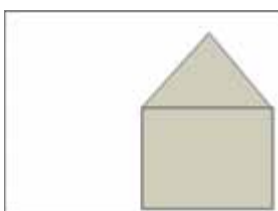
Recover a color from the screen



It is possible to recover a color among those present in the current drawing in order to work with it again.

To do this: either click on the A color (on the diagram opposite, the main color is marked with a circle) or on the Color Picker icon : . The cursor of the mouse or tablet appears with a question mark. You may then point the cursor wherever you want, the color A will change into the color you point at. The shortcut for this action is the [;] key.

Redo and undo ...



We will now draw the roof of our house.

For this purpose you may use the *Line* tool and the *Floodfill* tool.

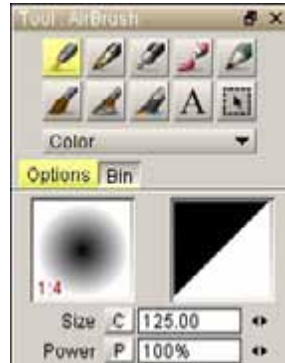
However, attention must be paid not to leave any "holes" before floodfilling in a surface (or the entire screen will be floodfilled!)

Your turn now! You should be able to draw the picture opposite without any trouble.

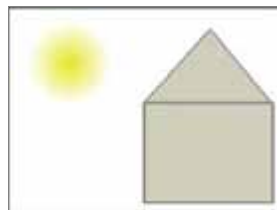


Nevertheless, if you do not like the result you can go back as many times as you want using the *Undo* option (keyboard shortcut [U]) on the main panel. Note that the *Redo* option (keyboard shortcut [Shift+U]) has the opposite effect.

Notion of layers and colored background



Let's add a sun.
Change the tool by selecting the *FreeHandDot* icon in the main panel and then the *Airbrush* tool (set the size to 125 pixels radius and the power to 100%).



Using the method described above, recover the yellow color in the *Mixer* tab of the color picker, then click on the white part of the image to draw your sun.
You will obtain the result shown opposite.

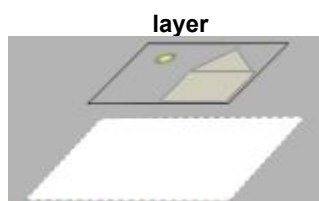
At this point, it seems at first sight that the image is mainly composed of white... in fact, that is not the case !



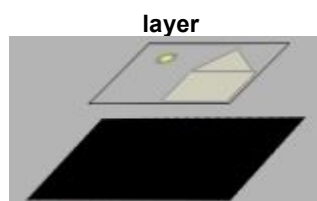
If the layer window is not visible on the screen, click on the *Timeline* icon on the toolbar to make it appear (keyboard shortcut [0] on the numeric pad).



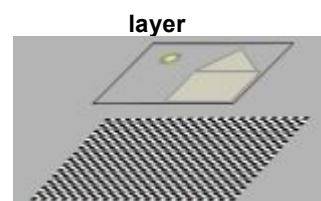
Now change the *Color* option (bottom left of the timeline) into *None*, then into *Check* and note the changes taking place in the current project window.



background = *Color*



background = *None*



background = *Check*

Everything happens as if our house and sun were drawn on a glass plate, the latter resting on a colored background (see perspective diagrams above...).

What we will refer to as *Image layer* in all future lessons is the equivalent of a transparent glass plate placed on a colored background of your choice. You are drawing on this plate and not on the colored background.

It is possible to change the color of the backgrounds *Check* and *Color* in the same way it is possible to recover a color on the screen thanks to the color fields next to the menu.

Zoom and View options



Stay in "check" mode, we will zoom in on the sun.

To adjust the zoom, you can:

- * Use the small « + » and « - » icons above as well as the mini-sliders.
- * Use the keyboard shortcuts [<] and [>].
- * Adjust the zoom numerically by modifying the percentage in the text field intended for this purpose.
- * Use the *Zoom* button on the main panel: once enabled, this button may be used to increase or decrease the zoom at an exact point of the current image by simply left or right clicking with the mouse.

Note that there are other options in the project window which may facilitate your task :

- * The button « 1 » enables re-initialization of the zoom to 100 %.
- * A left click on the « F » button re-aligns the image in the project window.
- * A right click on the « F » button extends the project window to display the entire image.



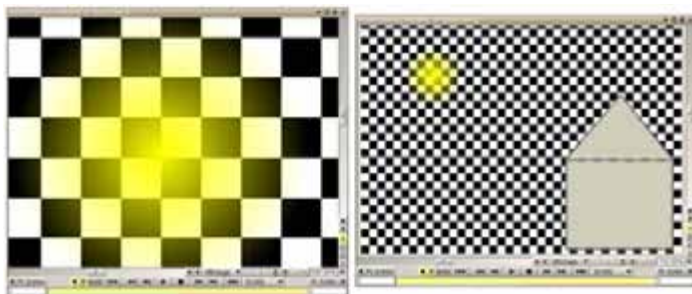
These zoom options are available to make your task easier when working in detail. However, they do not modify the videos, photos and images themselves. You will find them all in the *View* main menu.

Your project displays are anti-aliased when zooming-out (20, 25, 33 or 50% of the original project size) This very useful for people who works in very high resolution. (for exemple the HDTV format)


In lesson 1 we learned that it is possible to work with several projects at the same time.

It is also possible to open several project windows for the same project.

You may use the [M] key of the keyboard or select *New project window* in the *View* main menu to do this. This is recommended when working with large zoom values and to keep an eye on the entire project.



Note that in this case, any modification made in one of the windows results in the same modification being made in all the other windows of the same project.

The  button of your project window also offers you several very useful viewing options depending on whether you use it with the left button of your mouse or the right button.

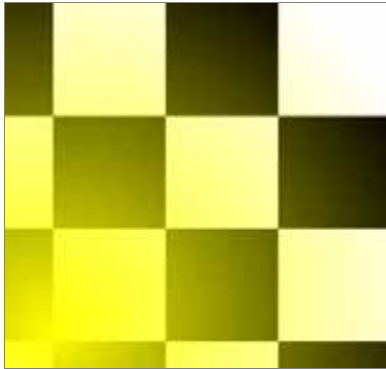
- * A left click, without releasing the mouse button, followed by sliding the mouse, moves the image in the same way as the sliders located next to it.
- * A right click without releasing the mouse button may be used to slide the current layer and only this layer to quickly view the enabled layer (see next lesson for the *layer* notion).

At the moment you release the button, the layer goes back to its initial position.

This is very useful when you are working with a large number of layers and you do not know which one is enabled.

This function is called *Shaker* and is accessible with the keyboard shortcut [A]. A simple touch on this key will make your current layer shake and reposition it immediately with the aim to rapidly view the current layer.

Notion of pixel opacity



After having zoomed to approximately 2000% it is to be noted that the pixels in the center of the sun are somehow "yellow" than those on the outside.

In reality, the pixels making up our sun are all yellow. However, the pixels in the center are less transparent (or more opaque...) than those on the outside.

You will notice that the pixels of the sun let the colors of the check background through with more or less intensity while the pixels of the house are completely opaque: it is impossible to see the check background through the house.

R,G,B and H,S,L color systems

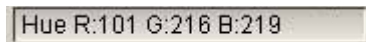


Open the *Slider* tab of the *color picker*.

It is possible to define a color from its components

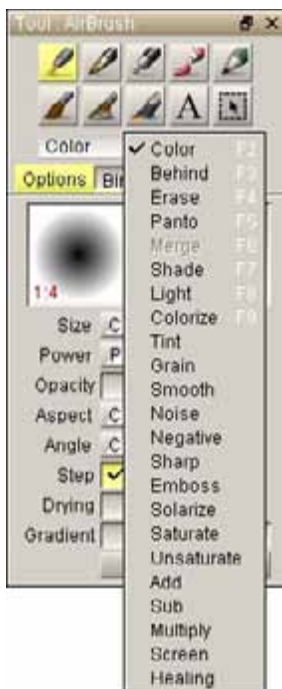
RGB : Red, Green, Blue or from the *HSL* system: Hue, Saturation, Luminosity. You may move the sliders to obtain the desired color or use numeric values.

(Select the color blue to continue the drawing).



If the *Sliders* tab of the color picker is not selected (i.e. on each tab of the color picker except *Sliders*), a line referred to as *Status bar* is visible. This line is used to display the values in the RGB system of the *A* color (click on this bar to make the color appear in the HSL or hexadecimal systems).

The drawing modes



There are several drawing modes in TVPaint Animation Pro:

Color, Behind, Erase, Panto, Light, Shade, Tint, Colorize, Smooth, Grain, etc.

We will look at each of them in turn.

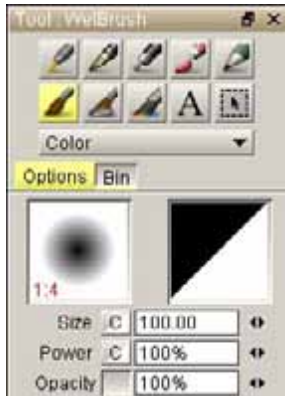
They are available in the popup menu located under the icons of the *Tool* panel (left click to access it).

If required, you may assign keyboard shortcuts of your choice to the various modes proposed (see lesson 1).



Some modes may not be used with all tools.

The *Color* and *Behind* drawing modes

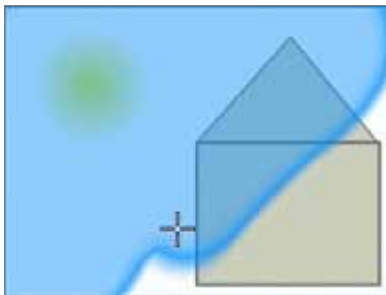


We will now draw a blue sky.
To do this:

- * Select the *Freehand line* icon (in the main panel).
- * Select the *wetbrush* tool (size 100 pixels, power 100%, opacity 100 %).



The red «1:4 » indicates that the tool is four times larger than the one visible in the white rectangle to the left.



Wetbrush in *Color* mode

You have already seen the *Color* mode (keyboard shortcut [F2]) as you have been using it since the beginning of this lesson...
When you use the *Color* mode, your line and color are applied over the already existing image.



Wetbrush in *Behind* mode

When you select the *Behind* mode (keyboard shortcut [F3]), TVPaint Animation Pro will take into account the already existing pixels from the line as well as their level of opacity. When the option is chosen, the color is only applied to the transparent surfaces of the image. The color is therefore not applied over the house or over the sun but is partially visible through the latter. Floodfill in the entire image in blue using this mode.

Mechanical pencil and *Pencil* tools



A few words about the *Mechanical pencil* and *Pencil* tools to finish off our drawing.
Select the *Pencil* tool (in *color* mode) and one or several shades of green. They are used to add grass at the foot of the house.
For more precise drawing (e.g. a signature), the *Mechanical pencil* tool is the most suitable.

The drawing above will serve as a basis to study the other drawing modes.

The *Erase* drawing mode



Airbrush in *Erase* mode (background=check)

The task of the *Erase* mode (keyboard shortcut [F4]), as the name implies, is to erase the pixels of the current layer by making them transparent.

Thanks to this mode, it is possible to correct possible faults in a drawing.

Opposite, the *Erase* mode is used on a check background.

The *Shade* and *Light* drawing modes



Airbrush in *Light* mode

As their names speak for themselves, these drawing modes require almost no additional explanation. They are used to brighten or darken the opaque areas of the image where you draw your line.

Just note that the higher the *Power* and *Opacity* of the drawing tool, the more the drawing carried out in these modes will approach opaque white or opaque black.

In this example, we used the *Airbrush* tool with a power of 100 % and an opacity of 17 %.



Airbrush in *Shade* mode



If the chosen background is white or black, do not confuse the *Erase* mode with these two modes : the modes *Shade* and *Light* modify the color of the pixels, whereas the *Erase* mode modifies their opacity.



The other drawing modes will be studied in lesson 7.

Further details

A Color and B Color




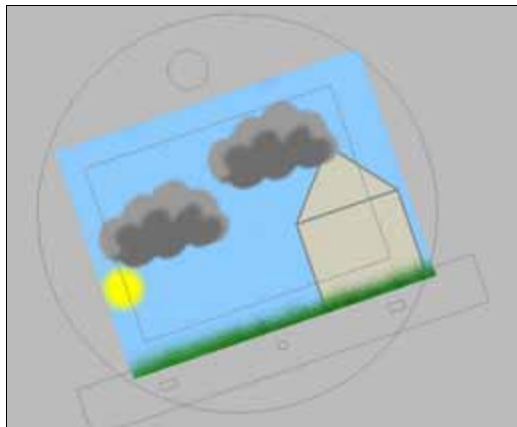
A very good tip:

It is possible to invert the two colors *A* and *B* of the color picker using the keyboard shortcut [N] or the  button on the *main panel*.

Rotation of the workspace

One of the most useful tools for any artist is the tool that allows rotation of the work top as one would turn a piece of paper while drawing. There are several ways to turn your workspace.

The button  located in the project window is used to freely define an angle by left clicking and holding the button followed by a left / right movement of the cursor. You will see the workspace rotate in real time and you just release the button once the desired angle is obtained. This free adjustment may also be carried out using the keys [Ctrl+Alt] + left click.



The free adjustment and its *HUD* in the form of a traditional drawing workspace

Reset	Insert
Rotate counter clockwise	Shift Page Up
Rotate clockwise	Shift Page Down
Set	
30°	
45°	
60°	
90°	
120°	
135°	
150°	
180°	
-30°	
-45°	
-60°	
-90°	
-120°	
-135°	
-150°	

You may also right click on the same button, which will open a menu (see opposite) in which you have the possibility to :

Reset the overall angle value (keyboard shortcut [Insert]),

Rotate the view +15° (keyboard shortcut [Shift+PageUp]),

Rotate the view -15° ([Shift+PageDown]), manually define an angle value (*Set option*) or choose a pre-defined angle among 15 values all multiples of 15.

Note that *Rotate +/- 15°* will always be rounded off to the prior/next multiple of 15. For example, if you work at first with an angle of 25° and then decide to tilt the project by +15° using [Shift+PageUp], you obtain an angle of 30° and not 40° as 30 is the first multiple of 15 after 25.

Management of palettes and mixers



The *Mixer* and *Bin* tabs in the color picker may be used to optimize your choice of color.

A right click under one of the two tabs enables display of a contextual menu which is specific to this purpose and offers many choices (see opposite the *Mixer* tab menu).

At first you can choose to work with pre-defined mixer surfaces: blue, clouds, inks, dirty, nebula, etc. or pre-defined palettes: TVPaint Animation Pro 1, 2, 3, 4 and gray.

If the mixer and palettes proposed are not what you want, TVPaint Animation Pro also offers you the possibility to create, duplicate, rename and cancel your own palettes or mixers. These options are also accessible via the contextual menus (options *New*, *Copy*, *Rename*, *Delete*).



It is possible to modify the existing or newly created mixers : a left click on the mixer surface incorporates the A color to the visible mixer which can then be «spread».

If you are not satisfied with the color obtained, you can delete it with the *Delete Mixer* choice.



In the *Bin* tab you have some additional choices in the contextual menu: *Replace*, *Swap*, *Spread* and *Delete*.

These choices act directly on the current palette.

You may respectively: replace the color in one field by the current color, swap the colors of two fields, spread the colors from one field to another and delete a field.

Once you have created the mixers and palettes adapted to your needs, do not forget to save the configuration when you quit TVPaint Animation Pro. In this way you will have your color parameters at your disposal the next time you start the program.

You can import or export palettes and mixers at any time via the *File* sub-menu. This enables exchanges between users of the software.

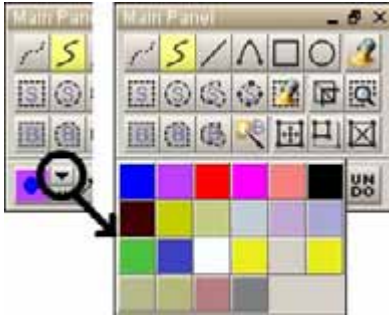
It is possible to return to the default mixers and palettes of TVPaint Animation Pro using the *Default palette* or *Pre-defined palette* choices in the contextual menus.


The pre-defined palettes et mixers may be restored by resetting the TVPaint Animation Pro settings.



You should note, however, that the last two operations will delete the palettes and mixers that you have created yourself unless you have exported them previously.

Colors History



When you draw with TVPaint Animation Pro, the history of colors you have used is accessible with a right click on the color square on the main panel or a left click on the  button (see opposite).

It is therefore very easy to re-use a color that you have recently used.



It is possible to shade the colors A or B by left clicking on the latter in the main panel or the color picker and then keeping the button [Ctrl] pressed when moving the mouse to another color on the screen.

The Color Variations panel

The *Color Variations* panel is accessible thanks to a right mouse click on the color box of the main panel or via the *Window* main menu.



It puts at your disposal several ranges of color, derived from the current A color.

Some luminosity variations based on the A color

Some saturation variations based on the A color

Some chromatic variations based on the A color

The *Step* option allows to adjust the chromatic variation

If the *Lock* button is not checked, the color boxes are automatically refreshed if you change the A color. (A simple click on a color of the *Color Variation* panel will change the A color into the one you have chosen)

If the *lock* button is checked, the color boxes will stay the same whatever you do.

Drawing splines, segments and circles



This icon on the main panel enables the *FreeHandDots* tool.



This icon enables the *FreeHandLine* tool for continuous lines.



This icon is used to trace *Straight Lines*.

To draw a segment in your project window:

- * Left click on the first end of the segment,
- * Keep the button pressed while sliding the mouse,
- * Release the button when you reach the second end of the segment.



At the beginning of this lesson we learned how to draw a *Rectangle*.



This icon is used to draw *Circles* and *Ellipses*.

In the current project window, point your stylus to the center of the ellipse to be drawn, then move it to create the ellipse you desire. Press the [Shift] key first to obtain a perfect circle.



This icon offers you access to more complex *Splines*.

By default it is possible to trace multi-point splines. The latter are also referred to as *Bézier Splines* by mathematicians. By modifying the options in the *Shape Settings* window, it is also possible to draw three-point splines (see following section).

To trace a multi-point spline in your project window: with a few clicks or presses with the stylus on the current project window, you can construct a broken yellow line interspersed with knots.



This line is not directly integrated in the drawing: The option *Apply spline* or the keyboard shortcut [Enter] is required to obtain a result (a right click calls up the contextual menu shown opposite).

The advantage of this tool is that it allows to work on the knots.

* A left click on one of the knots followed by a movement of the stylus allows you to move or edit the spline line of the broken line at this point. In the latter case, the tangential lines of the spline appear (see the red spline in the diagram below).

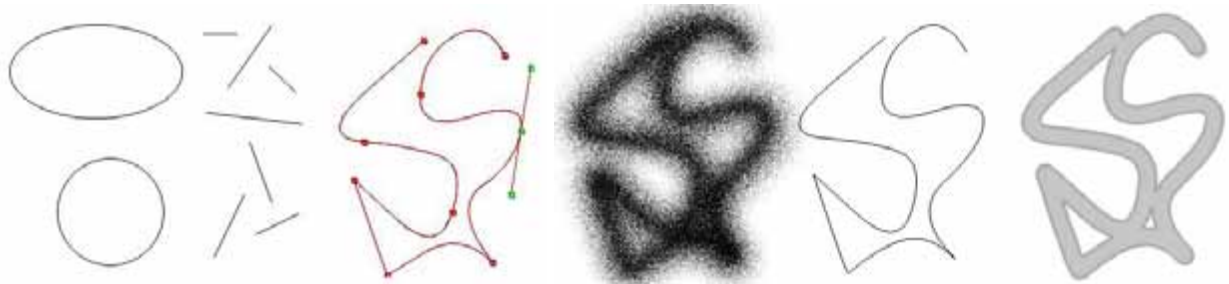
* For more precision: the [Ctrl] key allows you to work on the line of your choice without influencing the position of the second.

* You may also move the spline globally by pressing [Ctrl]+ left click outside the spline.

* Finally, it is also possible to close the spline via the option in the contextual menu.



The form of the circles, rectangles, splines ... obtained using the procedure described above, depends on the tool chosen: penbrush, airbrush, pencil, etc. (see above).



circles / segments / Bézier splines (applied using different tools)



The *Add to bin* option allows to keep in memory the current spline. It is often very useful, especially if you need to re-use it later. (Once the *Add to Bin* option is selected, the software asks you to name your spline)

Re-using a stored Spline can be done by choosing its name in the menu.

You can also delete a stored spline thanks to the *Delete* menu.



Your splines will be kept in the bin after restarting the software only if you saved the current configuration.

Please remember that if you delete or reset the configuration, all your Splines will be lost.

Adjust the *Shape settings*



The panel shown opposite is accessible in the *Windows* main menu or with a right click on one of the seven drawing tool (dot, freehand, segment, spline, rectangle, ellipse and floodfill).

- * In the first popup menu you can define two methods of drawing circles. You may choose to:
 - draw your circles fixing a centre and then a radius.
 - draw your circles defining three points on the screen (geometrically, there is only one circle passing through three non-aligned points in the drawing).
- * In the second popup menu you can modify the nature of the splines you will draw using the *Spline* tool studied previously. You may choose to:
 - draw Bézier splines (*multi-point splines*).
 - draw *three-point splines*.

To draw a three-point spline in your project window:

- left-click on the first end of the spline,
- keep the button pressed while sliding the mouse,
- release the button when reaching the second end of the spline,
- slide the mouse,
- left click when satisfied with the spline.

* The section named *Panto* enables adjusting the vector of the *Panto* mode studied in the following sub-chapter.

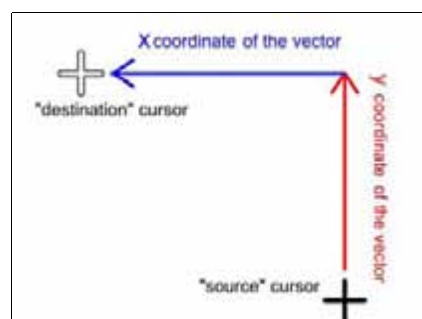
The *Panto* drawing mode

The *Panto* mode is used to reproduce, by translation of the vector of the X,Y coordinates, all sections of the layer (the X,Y values being those present in the *Shape settings* panel).



It is possible to interactively define the X,Y values using the *Adjust* button (keyboard shortcut [Shift+P]) of the *Shape setting* panel (tracing a segment on the screen will determine the X and Y values).

E.g. for X= -360 and Y= -238 you will obtain, after having used the penbrush to draw a line at the height of the sun in the final image (corresponding to the diagram below) :



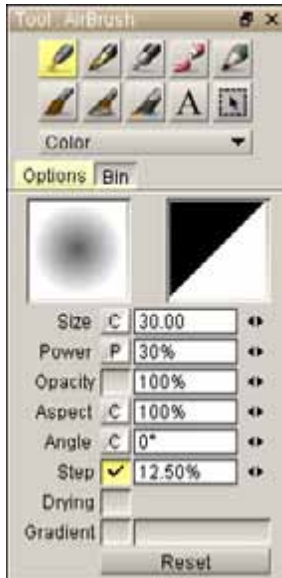
Here are the steps to use the *panto* mode correctly :

- 1) first, use the RMB on main panel tools and set the vector X and Y (set values or click on the 'Set' button and draw the vector on your project).
- 2) choose a drawing tool like Airbrush and set drawing mode *Panto* in the popup menu under the drawing tools icons.
- 3) on your project you have two cursors. One simple for the source and an other with preview for

the destination. Pixels under the first one are moved under the second one with the settings of the current tools.

Setting the tools

You have numerous variables at your disposal to set your drawing tools. We will describe them in detail except for *Drying* and *Gradient* which are explained in lesson 3.



- * The variable *Size* defines the tool radius in pixels.
- * The variable *Power* defines the color quantity applied by the tool.
- * The variable *Opacity* defines the global tool opacity.

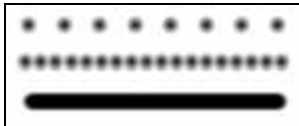
The opacity defines a maximum opacity threshold which the drawing tool cannot exceed.

- * The variable *Aspect* enables flattening of the current tool.
- * The variable *Angle* authorises rotation around the tool Z axis.
- * The variable *Step*, if enabled, manages the waiting time between two applications of the same tool.



In the little window to the left, it is possible to view the effect of the modification of each of the first five variables on the tool.

Some examples to help you understand the notions mentioned above:



See opposite, a straight line traced with, from top to bottom, the percentages 300%, 100% and 0% for the *Step* variable.



TVPaint written with the airbrush tool :
Angle = 90° and *Aspect* = 20%



Mechanical pencil tool left without *Smoothing*, right with *smoothing*.



If required, the Reset button resets the settings of the displayed tool.

Drawing filled shapes

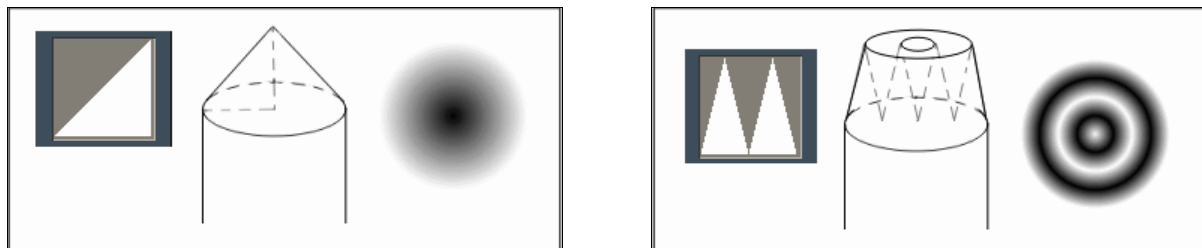


With the exception of the *FreeHandDots* tool, a second mouse click on one of the icons described previously enables the *fill* function. You may thus draw filled disks, rectangles and other filled splines. A second click on the *FreeHandDots* tool enables the *SimplePoint* tool which is used to draw only a single application of the brush.

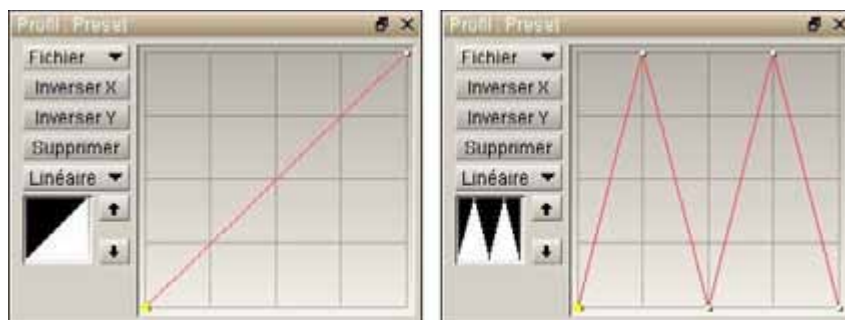
This is an alternative to the Floodfill option in simple cases.

Setting of the brush profile

The right field in the tool panel provides a view of the drawing tool cross section. Below you will find two profile examples for the airbrush drawing tool.



left to right: profile, three-dimensional view of the tool and its effect on the screen.



The profile of brushes may be edited in the window shown opposite.

Right click on the profile of the tool you are using to make it appear.

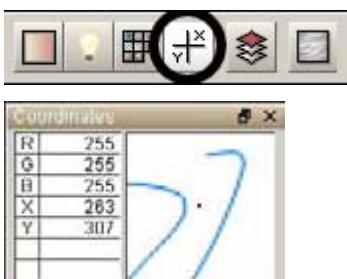
You have the choice :

- * to create or delete the points of the spline.
- * to move the latter.
- * to flip to the spline along the horizontal or vertical axis.
- * to choose the method applied to connect the points with each other: *Linear*, *Spline* or *Polynomial*.
- * to select a pre-defined profile, if required:

to do this, use the two arrow buttons to scroll the pre-defined profiles and then click on the profile of your choice to display the corresponding profile on the screen.

As for the palettes and mixers, TVPaint Animation Pro offers you the possibility to *Load*, *Save* and *Reset* the profiles (*File* popup menu).

The coordinates



The *Coordonnées* window is accessible via the *Windows* main menu or via the icon of the tool bar shown opposite.

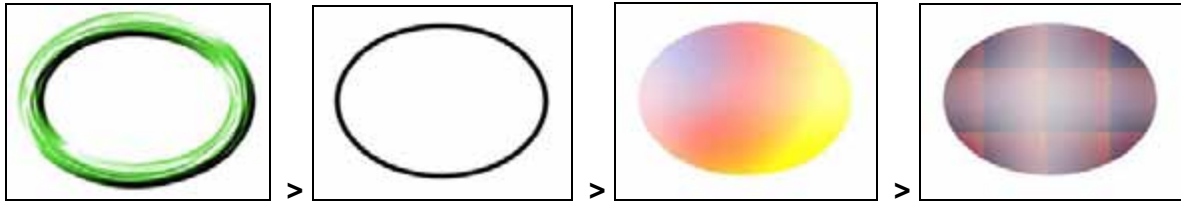
* left you find the coordinates in pixels of the pixel pointed with the mouse as well as its RGB values.

* right you find a small zoom box with a central point.

* if you draw a rectangle, the two empty lines will indicate the height and width of the latter in pixels.

There you will also find the length of the two half-axes if you draw an ellipse.

The *Re-apply* option



This is a situation that is often encountered:
you have drawn an ellipse on your screen...

But, you have used the wrong tool: you used the *Oilbrush* instead of the *Penbrush*. The *Undo* option allows you to go back (the ellipse drawn with the *oilbrush* will disappear), but you may have trouble drawing the ellipse again with the same precision...

Even when having noted the exact coordinates of the ellipse (center coordinates and length of the two half axes), it may be tiresome to reproduce exactly the same drawing on the screen.

The *Re-apply* option (keyboard shortcut [Enter]) was developed to counter this type of problem and facilitate your task...

When your ellipse is deleted, change the tool and adjust the parameters and colors. Then select the *Re-apply* option in the *Edit* main menu.

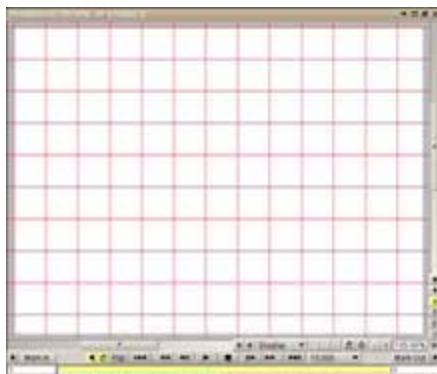
A new ellipse is drawn.

You may even do more than that as, before using the *Re-apply* option, you have the following choices : change the layer, select several layers, change the type of line to work with filled shapes... (see the examples above...)

It is even possible to define selections or cut animated brushes from the original drawing !

Use the *Grid*

The grid is, in fact, a kind of plotting paper the parameters of which may be set and the basic unit of which is the pixel.



Using a grid is very useful when :

- * drawing parallel lines,
- * placing a brush at regular intervals on the screen,
- * aligning a text along a vertical line,
- * etc.

As you have probably guessed, this option is also accessible in the *Tool bar* and the *Windows* main menu. Once enabled, it does not affect your project itself, but the way you will draw (just disable the option to make the red grid disappear...).

* The *Grid* panel which is accessible with a right click on the *Grid* icon in the *Tool bar* or via the *Windows* main menu is used to set the width and height of the boxes (use the numeric fields of the same name or the mini-sliders).

* The *Start-X* and *Start-Y* numbers will help you shift the grid on the surface defined by the work area.

* If required, you may adapt these four values in such way as to recover the image using the current brush and the *Brush size* button.

* The *Set* button is used to interactively define the grid parameters by drawing a dummy rectangle in the current project window.

* The *Show* box displays the grid when it is checked.

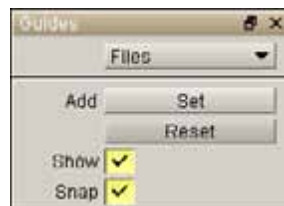
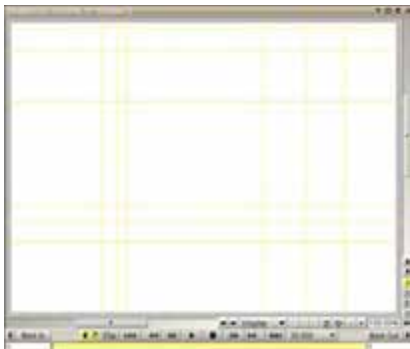
* The *Snap* box renders the grid magnetic. This option imposes that the user may only use the red pixels at the intersections of the horizontal and vertical lines. This works as if the cursor on the screen were magnetically attracted to the grid intersections.

Use the guides

The purpose of the *Guides* of TVPaint Animation Pro Pro is to create customized and magnetic marker points in the current project window.

When using the guides it is very easy to draw concentric circles or parallel lines.

To display the latter, left click on the *Tool bar* button shown below (a right click will open the window for guide parameter setting).



The following options are available in the guide parameter setting window:

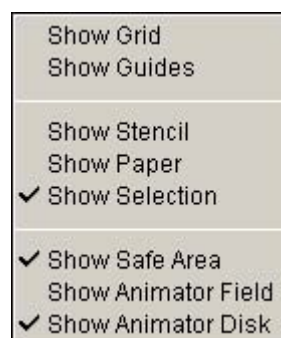
- * Once the *Set* button is selected, any click with the mouse in the current project window will generate a horizontal and a vertical line. It is therefore possible to create « a grid with irregular graduations » and to impose the line intersection points as the only points to be used.
- * The *Reset* button is pressed to go back to a project window without guides.
- * The *Show* box, when checked, displays the guides.
- * The *Snap* box imposes the yellow pixels at the intersections of the horizontal and vertical lines as the only pixels to be used. This works as if the cursor on the screen were magnetically attracted to the guide intersections.

The *Files* popup menu enables saving and loading of your guide positions.

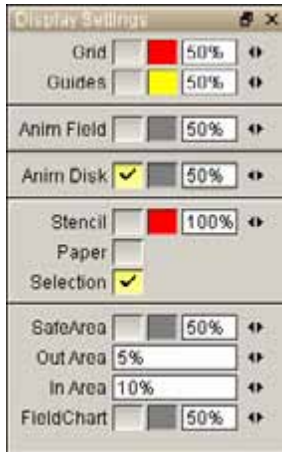
The Safe Area

The *safe area* may be displayed in the current project window: it may be enabled via its *Show* popup menu (see below).

It is therefore possible to recover the markers normally used in the film industry: the action and text safe areas allow viewing of what will effectively appear on the TV screen (i.e. the Safe Area).



Display settings



The *Display Settings* window is accessible via the *Windows* main menu and is used to choose the color and opacity of the guides, stencils, safe area, animation disk, etc.

You may also enable display of the stencil, paper and selections when using the latter.

The safe area has some additional parameters: position of the action and text safe areas may be set in percentages.

Lesson 3

Layers spatial management

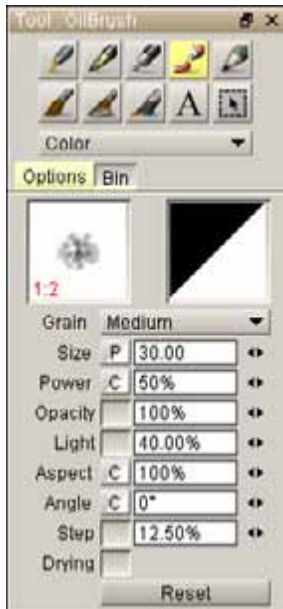
In this lesson you will learn to :

- Use the paper.
- Create a *Color Gradient*.
- Study the notion of the layer with its multiple aspects.
- Name, move and select layers.
- Assign a color to a layer.
- Manage the global opacity of a layer.

Layers and timeline

When starting the program, select the template *TVPAP – Image Layer* so that the newly created project only contains one *Image layer*.

The *Oilbrush* tool



We'll start by drawing a little man in the center of our image.

To do this, use the *Oilbrush* tool, select *FreeHand* and the red color (R=255, G=0, B=0).

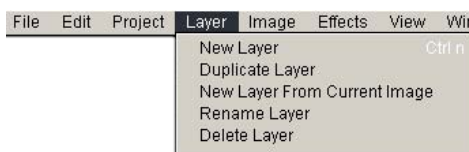
Now display the *Timeline* if it is not displayed yet (shortcut [0]). The following window will appear :



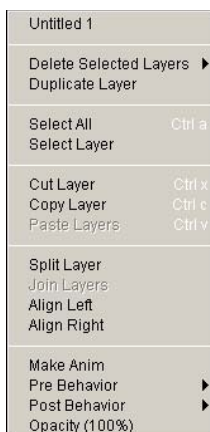
This window shows that our little man was drawn on a layer named «Untitled 1». Indeed, every layer has a name.

Rename a layer

We will now rename the layer. You have the choice to :

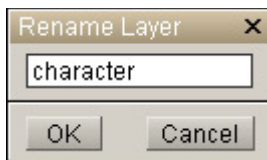


Select *Rename layer* in the *Layer* main menu.



Call up the popup menu by clicking on the layer name in the *Timeline* (here : « Untitled 1 »).

Once the popup menu is displayed, select the name of the layer at the top of the menu and release the mouse.

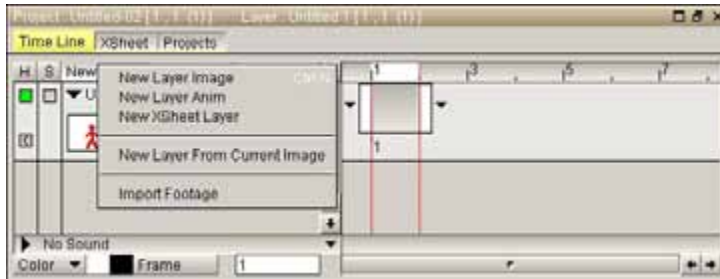


Independent of which method was used, a text window will appear. You may now enter the name (« Character ») in the text field and then validate it by clicking on OK.

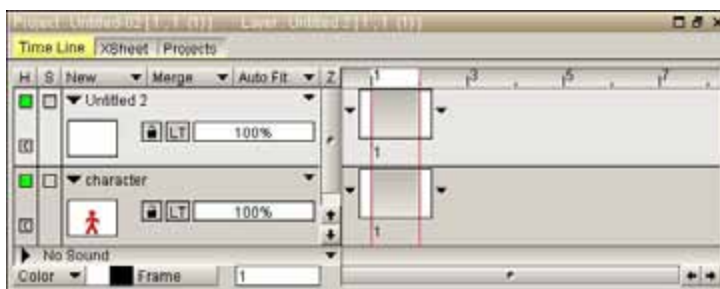
Create a New layer

TVPaint Animation Pro offers the possibility to work with several layers. With a bit of practice, this will make your work much easier.

To create a new layer you can :



Use the keyboard shortcut [Ctrl+N], select *New Layer Image* in the *Layer* main menu or select *New Image Layer* in the *New* menu of the timeline (see example opposite).



Our timeline now comprises two layers: the « Little man » layer and our newly created layer, referred to by default as « Untitled 1 ».

You may also rename this layer. We will call it « gray blob ».

The current layer

The « white » layer in the timeline is called *Current layer*. When you draw in the work window, the modifications are only applied to this layer. The « gray » layers remain unchanged, independent of their position.

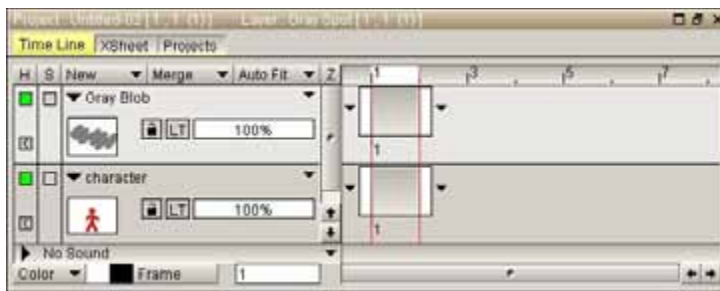
To change the current layer you can:

- * Use the arrow keys [↑] and [↓] on your keyboard.
- * Click on the layer of your choice in the *Timeline*.
- * Select *Current* in the popup menu which is accessible with a right click in the timeline.
- * Use the shortcut [,] to select the layer by clicking on it. Press [,] then the layer you wish to select. If there is a multiple choice, a menu will appear.

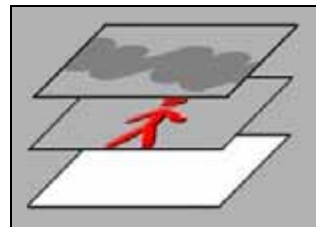
The advantage of working with several layers



Now draw a gray blob in the center of the image on the new layer using the penbrush tool (radius: 50 pixels, power : 100%, opacity : 100%, mode : color). At first sight, the gray blob seems to cover the little man. But in reality this is not the case...



When looking at the thumbs in the timeline, we see that the gray blob and the little man are on two different layers. We have thus superposed two layers on our white background, as illustrated in the diagram below.



« Gray blob » layer

« Little man » layer

White background

The gray blob therefore does not delete the little man.

If you use the same tool in *Erase* mode on the same gray blob, you will note that the little man will reappear!

Flip layers

Before continuing with our work, we will flip the two layers. This is how it is done: left click on the small frame representing the gray blob in the timeline, then slide the cursor on the timeline until it is under the « little man » layer. Release the mouse button.



before flip

>>



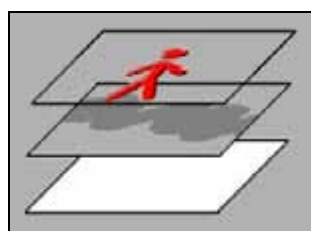
after flip



no flip (merge)



position of layers after flip



« Little man » layer

« Gray blob » layer

White background

We now have the configuration as shown in the diagram above. In the current project window, the little man is positioned on top of the gray blob.



When trying to flip two layers, a frequent mistake made is to move one layer on top of another. This is the process of merging two layers (which will be described in detail later in this manual).

The case being, click on *Cancel* in the merge options window to return to the original layer disposition.



The *Undo* option in the main menu may be used for the modifications made to the project as well as for those applied to the timeline.

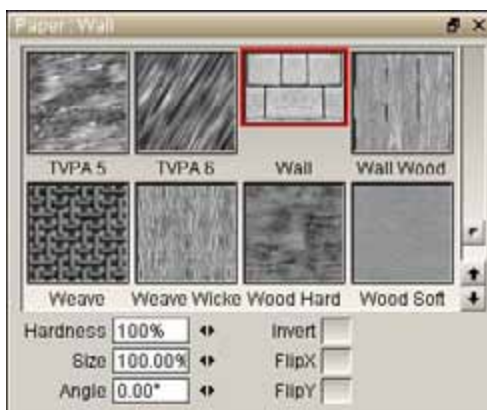
Erase the contents of a layer



It is possible to erase the contents of a layer without using the *Erase* mode.
To do this, just click on the icon of the main panel opposite or use the shortcut [Shift+K].
This option has no effect on the layer named « little man » which is not our current layer.

Use of a *Paper*

With TVPaint Animation Pro it is possible to accelerate drawing certain repetitive shapes such as a brick wall. Proceed as follows:



* Floodfill in the current layer (« gray blob ») with a dark gray color.

* Open the *Paper* window which is accessible in the *Windows* main menu or with a right click on the *Papers* icon on the tool bar.

* Select any type of wall in the papers window.

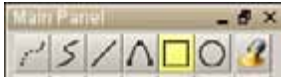
* Change A color for a light color, close to white.

* Floodfill in the « gray blob » layer using this color.



You will note that the paper you have chosen is used as a pattern to paint the layer surface (see drawing above). Our brick wall has been created and the « gray blob » layer may now be renamed « brick wall ».

Soften the contours of a surface

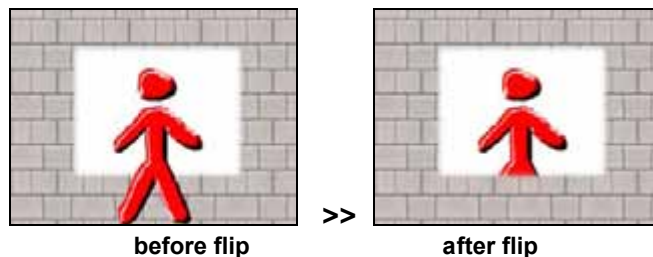


Let's continue our drawing:

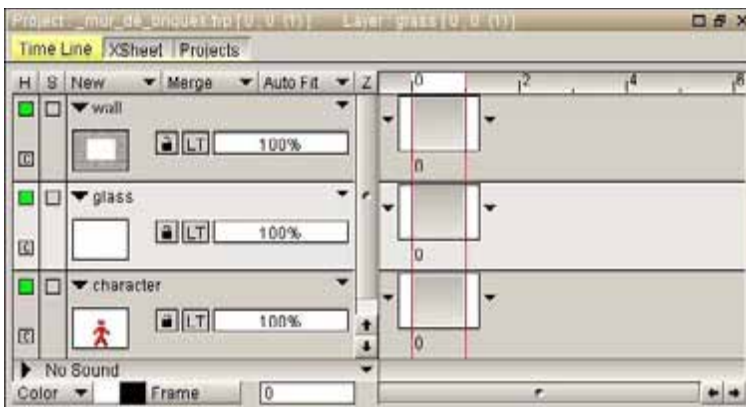
- * check that the « brick wall » is the current layer,
- * deselect the function *Paper* on the tool bar,
- * select the *Rectangle Fill* shape in the main menu, then the *Mechanical Pencil* icon in the tool panel.
- * enable the *Erase* mode,
- * in the option window named *Filling shape* which appears in place of the tool panel, set the value in the *Smooth* numeric field to 20 pixels.

* Draw a rectangle in the center of the image. The effect of the prior manipulation is immediate: the edges of the rectangle are less sharp.

* To finish, flip the two layers again.



Apply a color gradient



Our little man is now behind the brick wall.
We will add a tinted glass between the little man and the wall.

- * Start by creating a new layer, name it « glass » and place it as shown in the *Timeline* above.



* Select the color cyan for A color then a blue color for B color.

* In the *Filling shape* panel, change the *Erase* mode for the *Color* mode and tick the box *Gradient*.

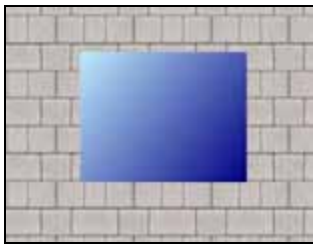
The gradient from A color to B color now becomes visible.

* Draw a *Filled rectangle* in the layer named « glass », paying attention that its dimensions correspond to the size of the « hole » in the brick wall.



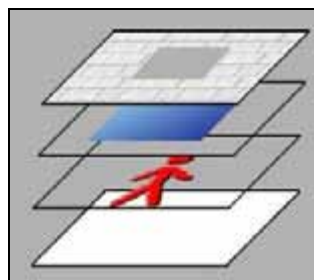
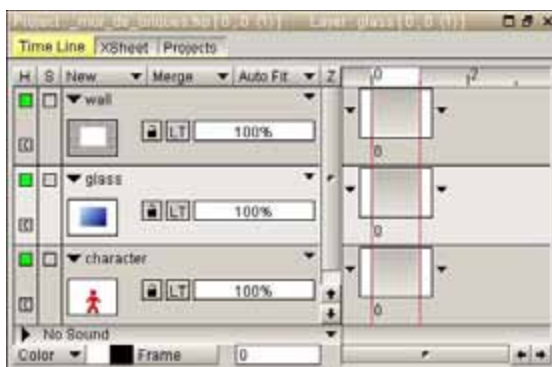
* The cursor shown opposite invites you to choose the *Orientation* and *Extent* of the gradient.

The gradient will be applied along the segment you will draw, from A color to B color.



You will thus obtain the result shown opposite in the current project window.

The perspective diagram and the timeline hereafter confirm the presence of three layers although only two are visible on the screen.



Brick wall layer

Glass layer

Character layer

White background

Modify the global opacity of a layer



You may modify the global *Opacity* of a layer:

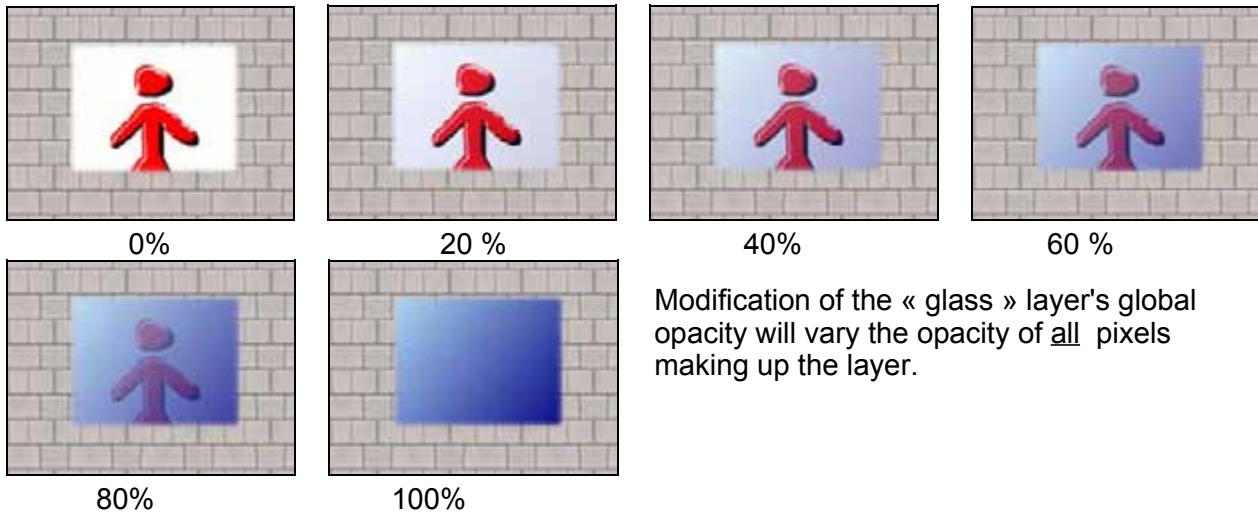
* by left clicking on the white bar on the timeline.

* by right clicking on the same bar to call up the numeric field shown opposite.

* via the contextual menu of the layer.



Global *Opacity* of the Glass layer with various values:



Gradients and Opacity mapping

The parameters for the pixel opacity of our glass may be entered as soon as the gradient is established:

1st method: the opacity gradient.

Erase the contents of the layer named « glass » and set its global opacity to 100%. Open the *Color gradients* window (right click on *Gradient* in the *Filling shape* panel or access it via the *Windows* main menu).

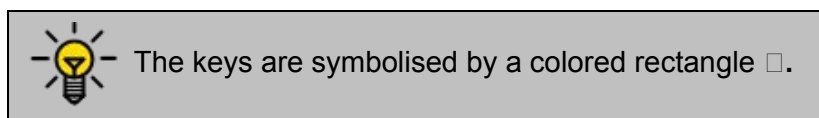


* The first horizontal bar represents the aspect of the gradient as it will be displayed on the screen.

* The second bar displays the colors chosen for the gradient. In our case, the two keys at the end indicate the A color on the left and B color on the right.

* The third bar indicates the opacity chosen for both colors.

Click on the left key of the opacity bar and modify its opacity using the *Alpha* mini-slider to adjust the percentage to around 20%.



The first horizontal bar changes and its left section becomes transparent (presence of a check under the cyan color).



Now draw the rectangle that represents our glass and you will note that the cyan section is transparent while the blue section is opaque.

Note that no modification was made regarding the global opacity of the layer named « glass ».

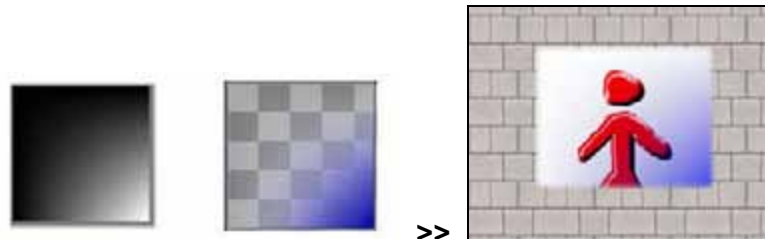
2nd method :



You may also use the *Opacity mapping* option in the *Filling Shape* panel.

If you draw a single-colored rectangle after having enabled this option, the opaque and transparent areas are respectively layered on the black and white areas shown in the frame below (see below).

For those who wish to know how to edit your own mapping, this is explained on page 16 of this lesson.



Show and hide a layer

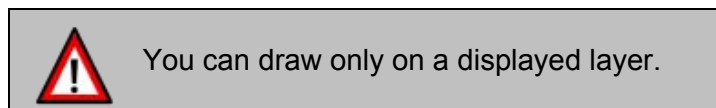


It is possible at any time to only show the layers of your choice.

The layers visible in the project window are those ticked in green in the first column of the timeline.

The hidden layers are those which are ticked in red in the same column and the name of which is displayed in gray (click on the color fields to toggle a layer from visible state to hidden state and vice versa).

Whatever the displaying options are, once the icon *H* is ticked, only the current layer is displayed.

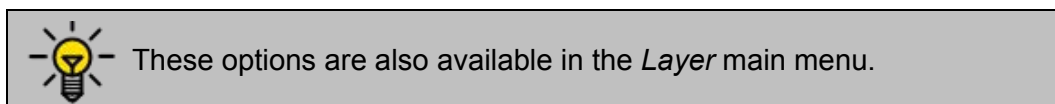


Merge layers

When it is no longer useful to work with several layers, you have the possibility to merge the layers.



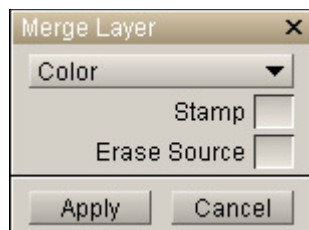
The *Merge* popup menu in the timeline offers you three options for this purpose.



- * *Merge selected layers* : the non-selected layers are not merged.
- * *Merge visible layers* : in this case, the hidden layers remain intact.
- * *Merge all layers* : the layer resulting from this operation contains the current image.



To select an additional layer (multi-selection): press the [Ctrl] key on the keyboard and left click on its thumb. You may also use the [Shift] key to select all layers between the last selected and the one you are clicking on.



Another possibility is to slide one layer on top of another and call up the merge options shown opposite.

If you tick the *Stamp* field, the merger is made according to the opacity of the layer moved and the A color.

You may choose to cancel or keep the original layer as well as apply one layer on another in *color*, *erase*, *behind* mode, etc.

Further details

Delete, duplicate a layer



* It is possible to delete a layer, an option which is quite different from erasing its contents... To do this, select *Delete selected layers* then click on *Confirm* in the contextual menu of the timeline (to do this, you may also use the *Layer* main menu).

* To duplicate a layer, proceed in the same way using the same menus.

Lock a layer

To lock a layer may be useful under several circumstances.

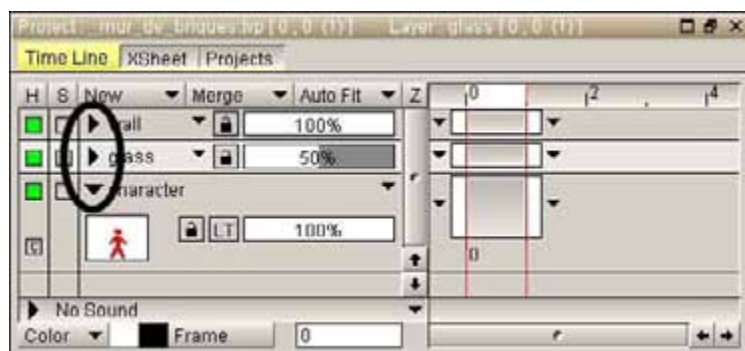
Click on the little padlock located in the timeline in front of the layer to be locked.



Once a layer is locked you may neither draw on it, nor delete it or modify its global opacity, nor select it as current layer.

Click again on the padlock to unlock the layer.

Reduce a layer

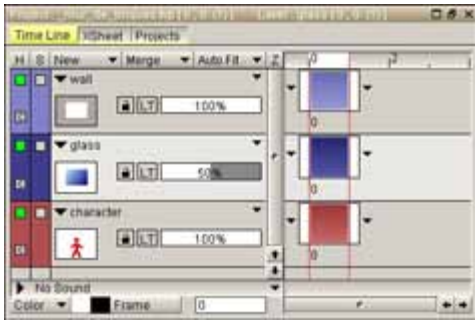


It is practical to reduce a layer when there are too many of them to be displayed on the screen.

A left click on one of the arrows in the black circle on the diagram opposite increases or decreases the size of a layer in the *Timeline*.

The layer itself is not changed in any way but only its name and global opacity are visible in the timeline.

Assign a color to a layer



Another operation that does not affect the layer itself is to assign a color to a layer.

This operation allows you to simply organise and mark the layers using pre-defined colors.

Click on the « C » icon in the first column of the timeline to modify the color of the chosen layer.

The color gradients

As for the mixers and palettes, there are pre-defined color gradients which you may *Copy*, *Rename*, *Delete*. These pre-defined gradients are accessible in the popup menu indicated in the image below in the *Gradient* window.

It is also possible to create your own gradients according to your color and opacity criteria:



* A right click on one of the keys of the color bar enables you to either delete the key, to assign the A color or B color to it or to recover a color.

* A right click on one of the keys of the opacity bar enables you to either delete the corresponding key or to set its opacity (or alpha value).

* The *spread* number field mixes the pixels within the current gradient.

* The *Dither* numeric field works in the same way as the *Spread* numeric field but uses colors which are not necessarily among those you have chosen, although they are quite close to them (this process is often used in the video sector).

* The *Invert* option flips the current gradient.

* The ▽ cursor enables calibration of the transition zone from one gradient to another.

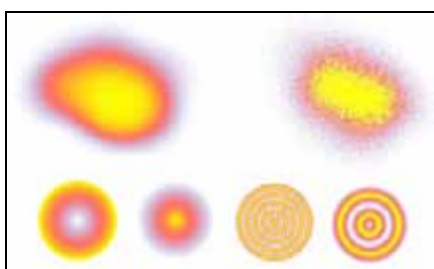
* The *File* popup menu enables you to load or save your gradients on a memory support. You may also choose to recover the pre-defined gradients of TVPaint Animation Pro if required.



Here again, it is necessary to *Save the configuration* to recover the gradients you have created using this program.

Color gradients and drawing tools

Color gradients are also useful when working with drawing tools :



Assigning a color or opacity gradient to a drawing tool provides a wide variety of interesting visual effects (see example opposite...).

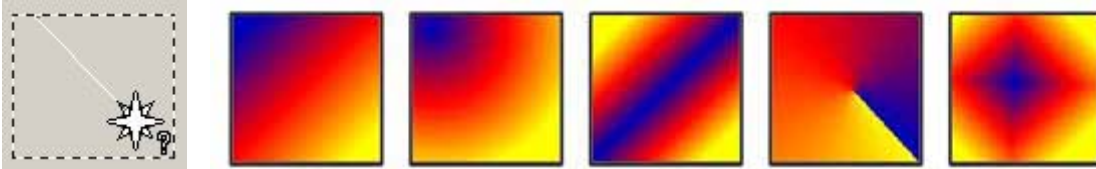
The more power applied to the tool or the more repetition on the screen, the more its color will cover the gradient chosen.

The different types of gradients



When the *gradient* field is ticked on the *Filling shape* panel, several types of gradients are available to you (click on one of the five buttons on the panel...).

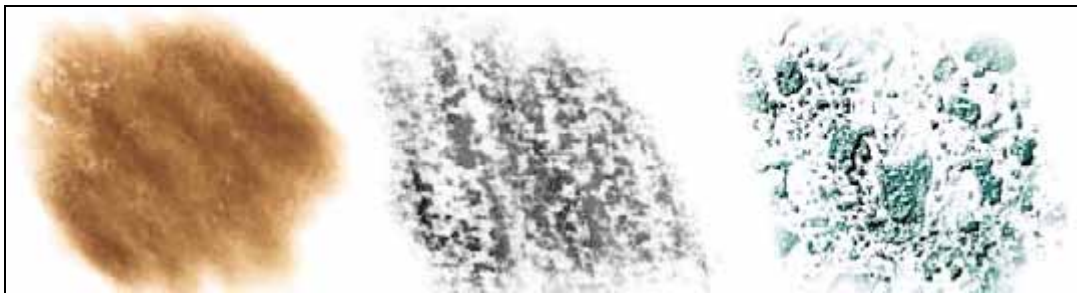
Whatever your choice may be, you will have to draw a vector on the screen to determine the direction and extent of the gradient (see below).



From left to right: the gradients *Linear*, *Spherical*, *BiLinear*, *Radial* and *Rectangular*.

Another use of papers

Apart from reproducing a given pattern, the papers may be used to simulate drawing on a real paper. The combination of papers with different drawing tools provides very realistic results and enables imitation of different drawing styles: charcoal, painting on glass, lithography, etc. (see below)

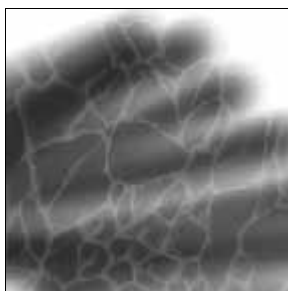


Some images are constructed using many papers.

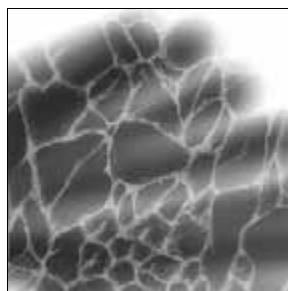
The image opposite, for example, which is available on the CD was compiled using 10 papers.

Numerous options are available in the papers window. You may:

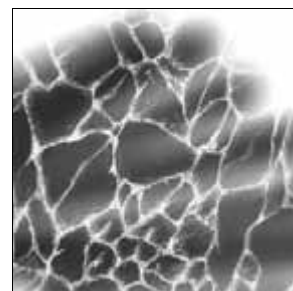
* Modify *Hardness*, *Size* and *Angle* of your papers.



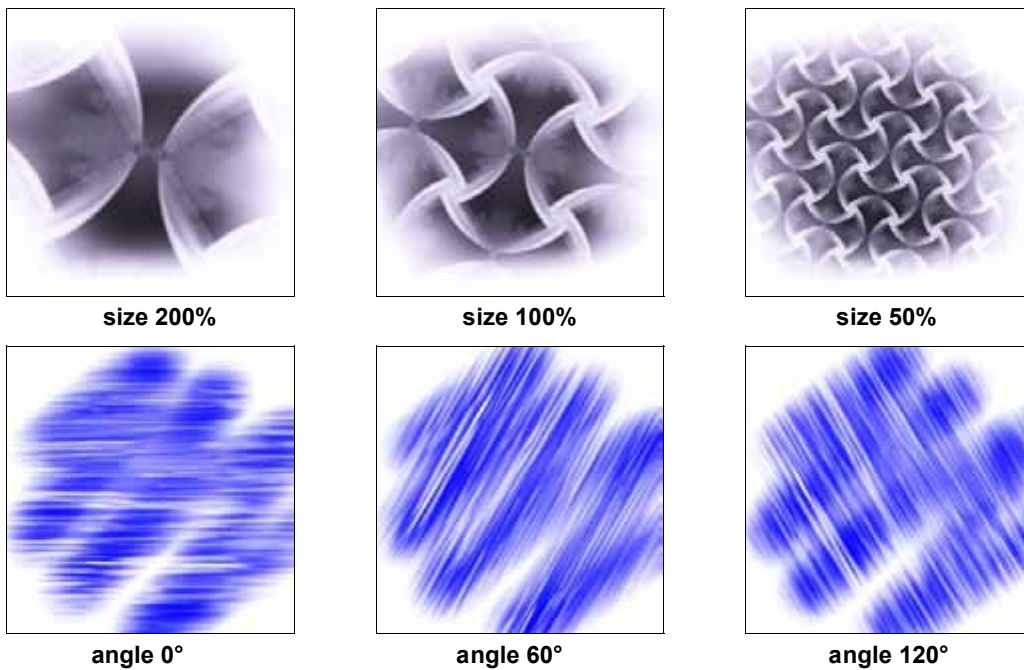
hardness 33%



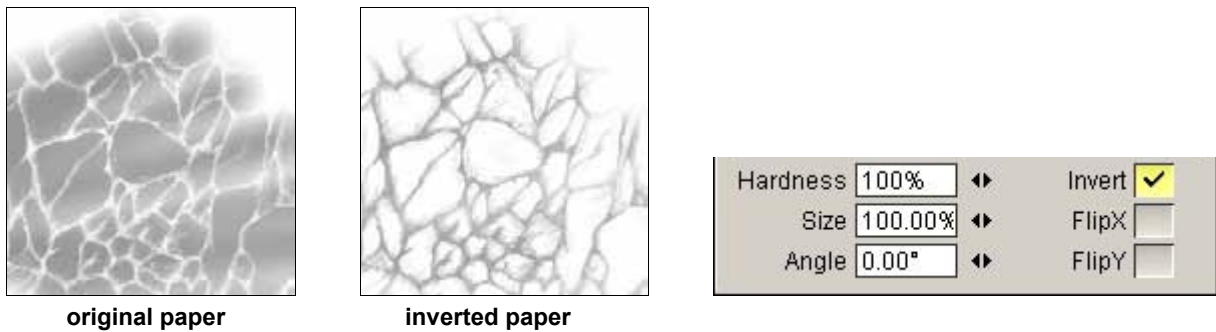
hardness 66%



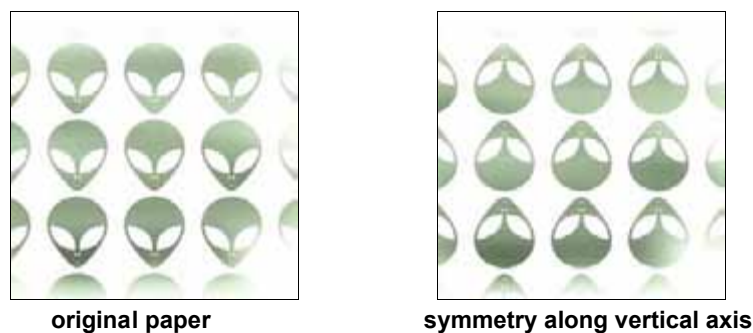
hardness 100%



* *Invert the papers (Negative option).*



* Create a symmetry along the horizontal axis or vertical axis before application (options *Flip X* and *Flip Y*).



Create and manage your own papers

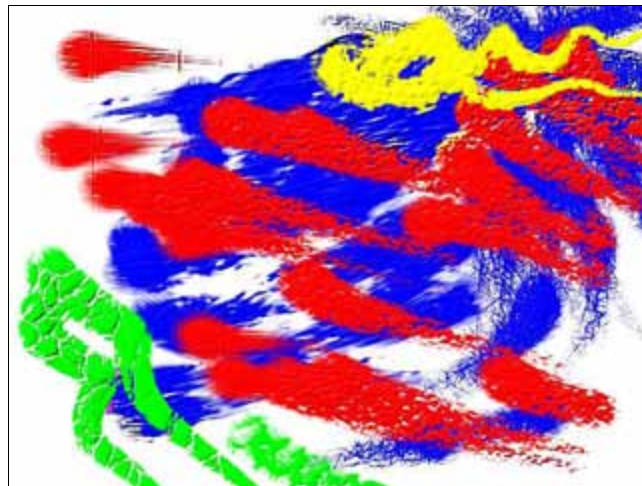
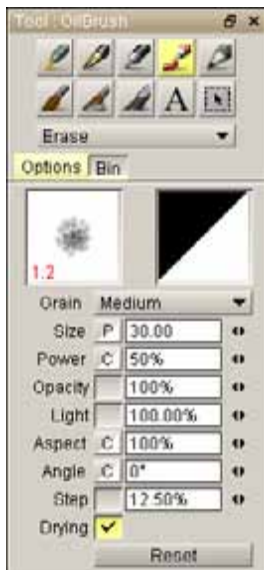


* Right click on one of the papers in the papers windows to either choose the latter or delete it.

* Right click on the part of the window that does not contain any papers to create a new paper from the current image.

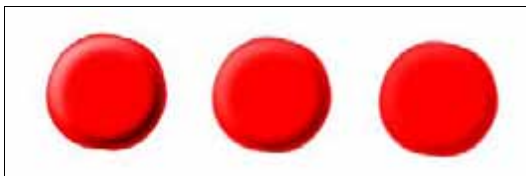
Note that your choices are only saved after closing the program if you have saved your configuration previously.

The *Papers* and the *Oilbrush* tool



As indicated above, the *Oilbrush* drawing tool also interacts with the various types of papers available (see opposite).

But the *Oilbrush* tool also offers many other functions...



It offers a *Light* parameter which gives volume to the paint (see opposite).

Various light parameters possible



without *Drying*



with *Drying*

By default, the oil paint is not deposited on top of the oil paint already on the layer : it melts into it. However, if you click on the *Drying* option, the former will be the case.

Note that there are different Grain modes available which are shown below:



silk



soft



medium



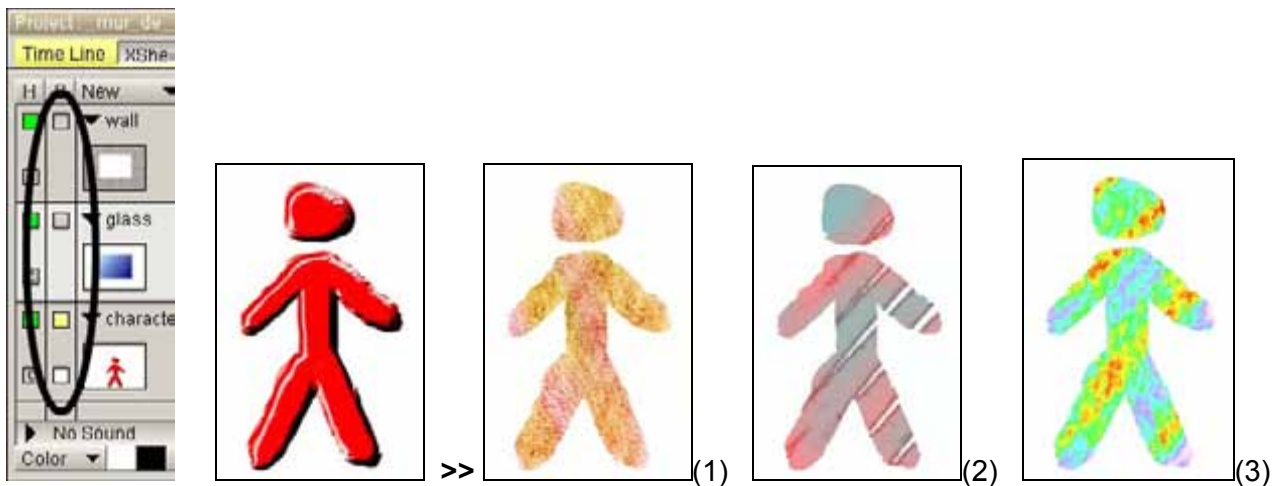
hard

Using the mask

Using the mask is very handy when handling the layers.

It enables you to draw, on the layer of your choice, the opaque pixels of another layer in exactly the same place.

In this way it is possible, for example, to modify the « texture » of a drawing without changing its shape (see below).



How to proceed :

- * First of all, create two layers in the timeline, then draw the little red man shown above in one of them.
- * Then enable the *Mask* for this layer :
to do this, click on the little gray rectangle in the second column of the timeline on the current layer. The little gray rectangle must turn yellow.
- * Hide the layer with the little red man, then move to the empty layer.
Any drawing will then be limited to the opaque areas of the layer containing the little red man.

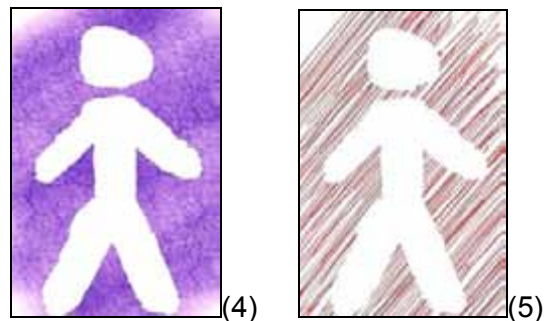
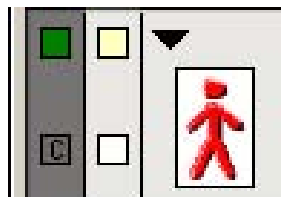
For example, drawing a filled rectangle with color gradient and use of a paper on the screen will display image 1, drawing with drawing tools, gradients, papers and specific modes will obtain the results 2 and 3.

It is possible to flip the mask and only draw on the transparent areas of the layer containing the initial little man (examples 4 and 5 below).

To do this, proceed as described above and click on the button *Invert the mask* indicated in the following diagram (this must then turn black).

Enable the mask - >

Invert the mask - >



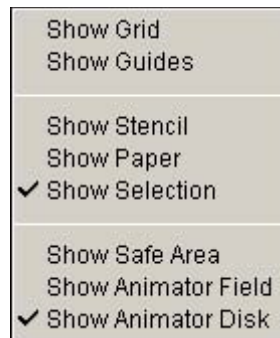
The S button on the timeline enables disabling of all masks or inverting of all masks according to your choice in the menu.
It is possible to work with several masks divided into different layers: in this case, the masks are added up.

When a pixel is partially opaque, it may only be partially modified when using a mask. For example, a pixel with 80% opacity can only be painted with maximum 80% opacity when the mask mode is used (if the mask is inverted, it may only be painted with maximum 20% opacity). Finally, you should understand that, when pressing the *Erase* button while using a mask, only the part of the drawing corresponding to the mask will be erased.

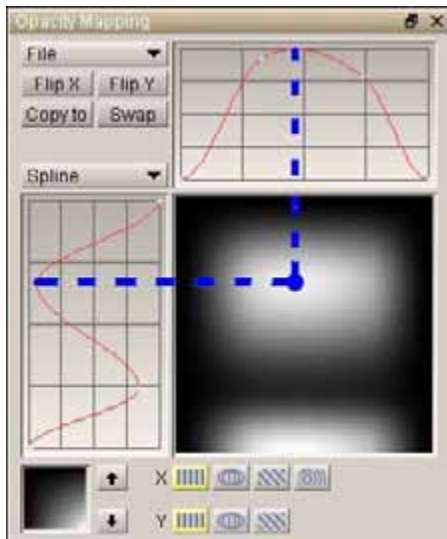
Displaying masks and papers

It is possible to display masks and papers on the screen to give a better idea of the project areas on which you are currently working.

To do this, just use the popup menu *Display* in the current project window (see below).



Opacity mapping



This window is accessible with a right click on the corresponding field of the *Filling Shape* panel and enables precise definition of the opacity and transparency areas when applying a filled shape.

You may trace the spline of your choice on the X and Y axes by placing points at your convenience. Three types of interpolation are available to connect the points with each other: *Linear*, *Spline* or *Polynomial*.

In accordance with your settings, a new opacity mapping will be defined.

The two red splines define the opacity of each point of the card as indicated in the dotted example.

The *File* popup menu enables saving, loading or resetting the opacity mapping.

As required, you may swap the two splines corresponding to the X axis and Y axis of the mapping (*Swap* button) or flip each spline vertically or horizontally (*Flip X* and *Flip Y* buttons).

The *Copy* button is used to copy the current spline (the one that has a point selected thus yellow) on the other axis. On the image above, the current spline is the Y spline.

At the bottom left of the window, pre-defined opacity mapping are at your disposal.

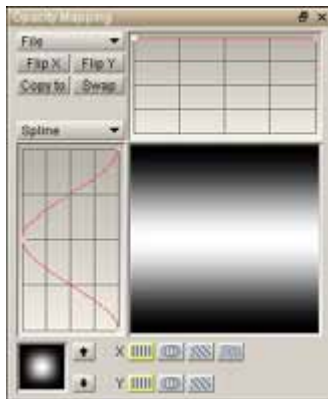
You may also adjust the mapping by clicking on the image and sliding the mouse.



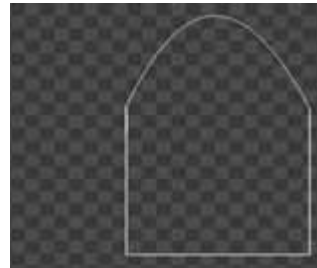
Here again, you have pre-defined parameters at your disposal. (Press the ↑ and ↓ buttons at the bottom left of the panel, then click on the pre-defined mapping of your choice.)



The icons at the bottom of the window have a special function. They enable you to choose how the *opacity mapping* will be applied in the filled shape you will draw.

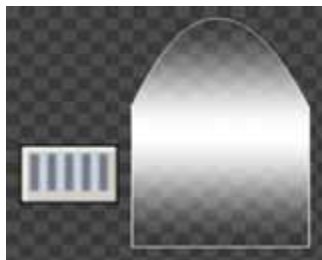


Let's take for example the opacity mapping (left) in order to floodfill a shape created using the spline tool (see below).

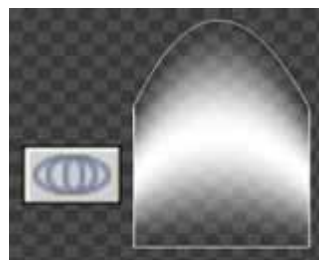


Depending on the options chosen at the bottom of the panel, the opacity mapping will be applied:

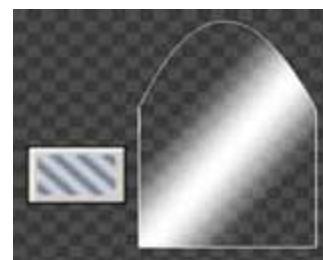
- * without modifications (1)
- * adapting to the shape you will floodfill (2)
- * according to a vector of your choice (3)
- * in a circular fashion along a vector (4)



(1)



(2)



(3)



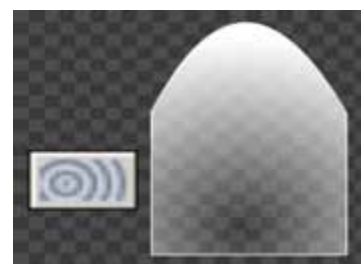
For case (3), you must draw a vector on the screen, as you have done for drawing a gradient.



For the fourth option, modify the X spline as shown in the example opposite.



For case (4), you must draw a vector on the screen. Note that the option on the Y axis is disabled.

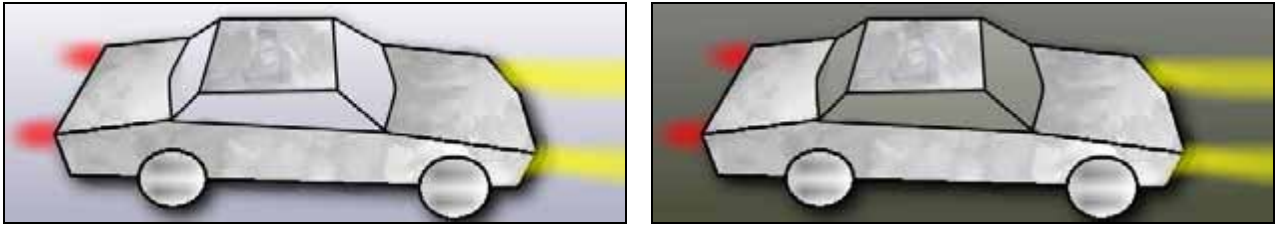


(4)

Some remarks for using the *Opacity* function

The *Gradients* and *Opacity mapping* functions combined for use in a layer are very useful for creating effects of lighting or transparency independent of the background color or scenery (as they are not part of it).

This is the case for windows, tinted windows, lamps, projectors, etc ...



Above, the opacity gradients were used on a layer to create car headlights. They must no longer be modified when the background color changes, which results in considerable time saving.

Lesson 4

Temporal management of layers

In lesson 3, we handled the layers using the timeline. However, the notion of time did not come up at all.

This lesson deals with the notion of time.

In this lesson you will:

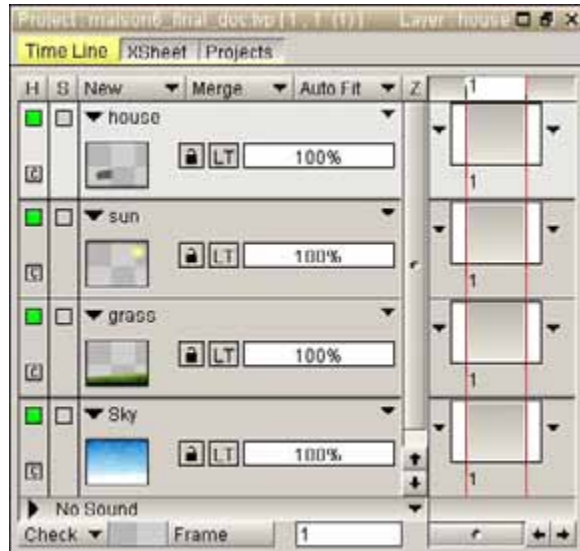
- Study the concept of the animation layer.
- Work with brushes and animated brushes.
- Handle the commands for project viewing.

Animation layers

Start by reproducing the image of lesson 2 in a project with square pixels (Aspect Ratio equal to 1), not using fields (see lesson 1 for an explanation concerning fields and ratio). The Image below has been drawn thanks to the *Oilbrush* tool.

Don't forget to place the house, sun, sky and grass on four different layers.

You should have the following timeline on your screen :



Creation and concept of an *Animation Layer*



Everybody knows how a film is projected in a movie theater: a film roll is placed in front of a powerful projector, enabling display of the pictures on a screen located a few metres away. The images are projected at such speed that they give the illusion of movement to the spectator.

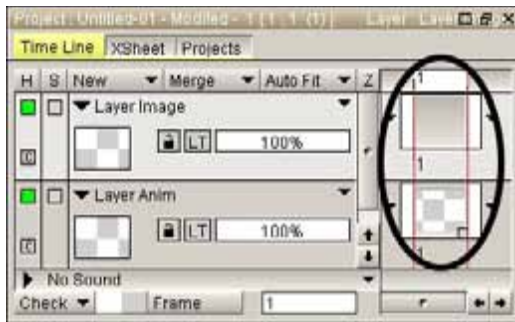
TVPaint Animation Pro works with the same principle: it is possible to create your own virtual film rolls and project them onto your television screen.

In TVPaint Animation Pro we refer to this roll as: *Animation Layers*.

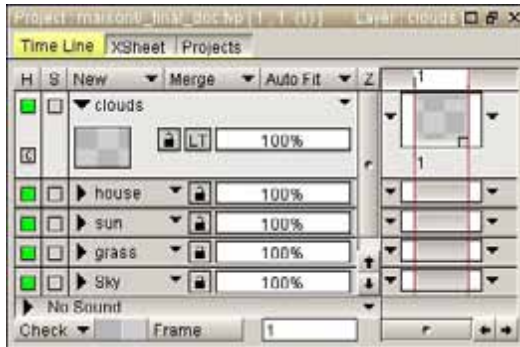
As we will see hereafter: the advantage of TVPaint Animation Pro resides in the fact that it is possible to superpose several rolls (for example: one with a background scenery, another with a character and another with a foreground scenery.)



It is possible to create animation layers using the *New* menu in the timeline.



An animation layer is represented by an icon in the timeline. An image layer only has a gray icon (see encircled area shown opposite).



Create an animation layer and name it « cloud ». Place it in front of all the others. You then have the timeline shown opposite.



Some layers may be reduced for future timelines (see lesson 3).

Add images



We have just created a single image (empty...). To make our first film, we have to increase the number of images in our roll.

To do this, you can use the keyboard shortcut [Shift+I] or choose *Insert Images before current image* in the *Layers* menu to add frames to the current layer.

Now you just have to enter the number « 9 » in the numeric field. This will give you a total of 10 frames.



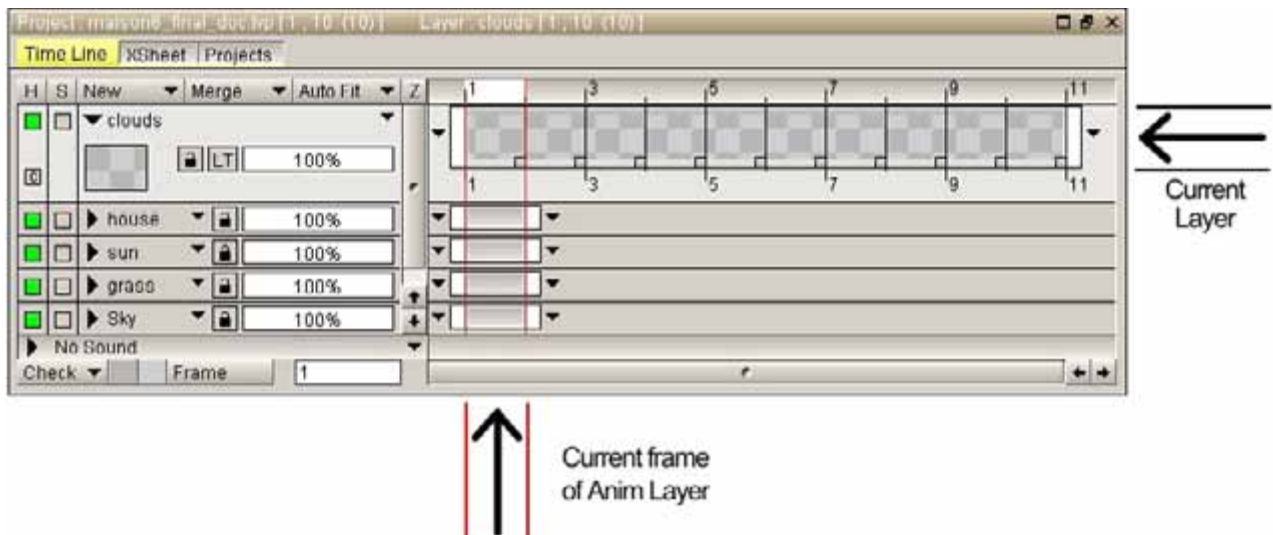
Movement and orientation within the timeline

Use the [↑] and [↓] keys to change the current layer.

When you are in an animation layer, you can move between the images of this animation using the [←] and [→] arrows on the keyboard.



You may also use the mouse to move inside the timeline, by clicking on the space-time location of your choice.



The white square with two red bars enables you to identify the image of the animation layer viewed in the window of the current project.

The title bar contains several indications. From left to right :

- * The name of the project you are working on.
- * The time code of the first and last image of the project (*TimeCode*, or image number).
- * The total project duration.
- * The name of the current layer.
- * The time code of the first and last image of the current layer (*TimeCode* or image number).
- * The total duration of the layer.

If working with time data provided in time units seems difficult to you, click on the *TimeCode* button at the bottom of the timeline. All prior values and time codes are then converted to image numbers. To simplify future lessons, we will from now on work in this way (later, you are free to work as you wish with your own animated sequences).

Create a brush



Go to the first image of the animation layer named « cloud » and draw a gray cloud using the tools of your choice.

Then reduce viewing to the current layer (icon *H* in the first column of the timeline or shortcut [=]).

We will create an animation in which the cloud will move from left to right. To do this, we have to make our cloud into a brush.



Select the icon shown opposite from the main panel. This option is used to carry out *Rectangle CutBrush*. But, what does this mean?



Let's take an example:
 Draw a *Rectangle* around the previously drawn cloud. When this is done, you will note that your current brush is not one of the standard tools: the cloud itself has become your brush!
 Press the stylus on your tablet if you doubt it: the cloud has turned into a paintbrush.
 Don't forget to erase your tests before continuing!



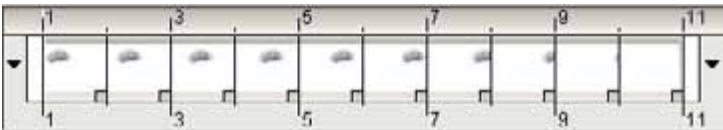
Several *CutBrush* tools are at your disposal in the main panel to simplify your task when creating a brush : *Rectangle CutBrush*, *Polygonal*, *FreeHand* and *Magic Wand*.

See opposite: 

The first animation

The first image in our animation layer « cloud » contains ... a cloud. The other nine images, however, are empty.

- * Go into the second image of this animation layer and apply the brush in order to place the cloud slightly to the right of the cloud on the first image in our animation layer.
- * Proceed in the same way for the third image of the animation layer, again moving the cloud slightly to the right of the one in the second image.
- * Proceed in the same way to the last image of the animation layer.

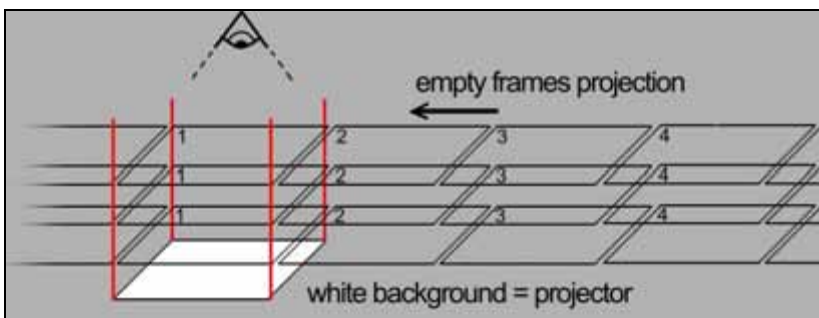


You will note that the corresponding icons of the timeline display the cloud and when you move inside the layer using the [←] and [→] arrows on the keyboard, your cloud will move!

TVPaint Animation Pro and compositing

Now extend viewing to all layers. Sliding along the timeline again displays the complete scenery for the first image but on the nine following images... there is only the cloud.

We learned how to stack our image layers like transparent glass sheets on a colored background in lessons 2 and 3.

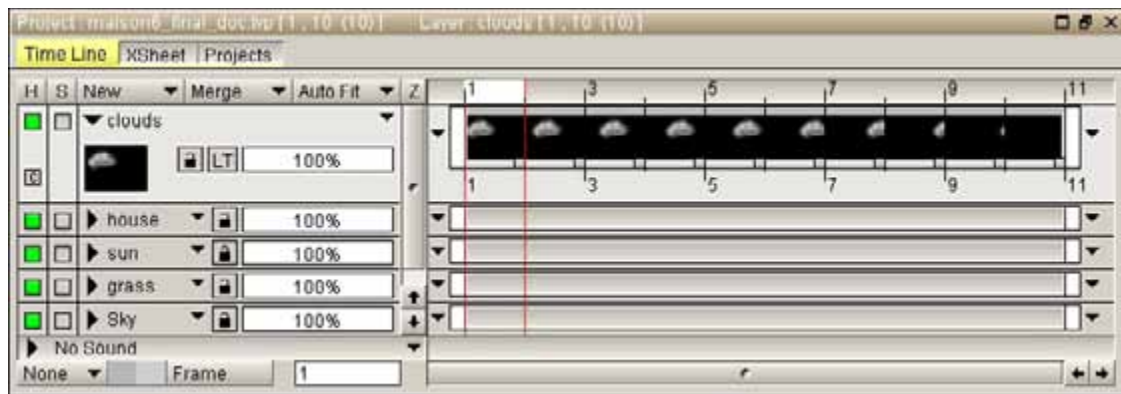


In a way it is possible to do the same here and stack the « transparent rolls » in front of our projector.
 The white background is used like a « white light » projector.

The image finally obtained is referred to as a « composite » image (composed of several images...)

In the case of our house and cloud, it is possible « to spread » the house and sun as fixed backgrounds or immobile backgrounds in time.

In other words, one of the transparent rolls may be composed of identical images.
 The procedure is simple:



In the screenshot above, we selected *background = none* in order to have a better readability in the timeline.

Select one of the four image layers in the timeline and use the *Insert frames* option as described above.

Do the same with the other image layers, then move within the timeline again: this time, scenery and moving cloud are still visible.



Play an animation

Using the keyboard arrows to play an animation is not very practical. You have certainly noticed already: the most suitable options are available in the current project window.

Here are the functions of all buttons available :

the traditional buttons *Play* and *Stop* as you will find on video recorders and camcorders, etc.

to advance or rewind one frame in the current layer.

to go to the first or last frame of your current layer.

to go to the *previous key* or *next key* (the notion of keys will be explained in the following lessons).

30.000 to modify the *Framerate* when playing the animation. Note that this value is not necessarily used when exporting your sequences.

Press this button to play the animation in a loop.

If you have chosen a sound track to accompany your project (see lesson 8 page 2), press this button to play it with your project.

the *Flip* button, keyboard shortcut [W] offers you a quick look at your work.

It allows you to play your animation starting a few frames before the current image and stopping a few frames after the current image. Then you come back to the image you were working on just before pressing the button.

The framerate used is the one selected in the project window popup menu.

The number of frames played on either side of the current image may also be set in the preview settings (see the *Preview Settings* section of this lesson).

* The yellow rectangle located in the graduated line underneath the buttons indicates the image and the number of the image currently displayed on the screen.

* The *Mark in* and *Mark out* buttons :

These are numeric or time values indicating the frame from which the animation will start playing as well as the frame at which it will be stopped.

In order for this function to be taken into account when playing your animation, you must enable the corresponding buttons.

Two red and green markers enable identification of the mark in and mark out points.



You may use the arrow buttons ↓ to assign your mark in or mark out point to the current image.

Now let's move on to field projects and/or projects with a ratio other than 1 :



The buttons *B*, *1* and *2* of the horizontal bar are only available when you are working with a project containing fields.

* Button *B* enables display of both fields simultaneously when playing an animation or video.

* Button *1* will display the field which you have defined as the first field.

* Button *2* will display the second field of the current image.



Note that the *1* and *2* buttons may only be used if your project is set to use fields. Furthermore, moving to the next image in a project containing fields will have the effect that the cursor of the current image does not move to the next image but to the next field (as an image is composed of 2 fields).

Button *A* of the current project window is used to enable/disable pixel *Aspect Ratio* display.



This does not modify the current project: only its aspect in the project window will be different.

The Remote Control



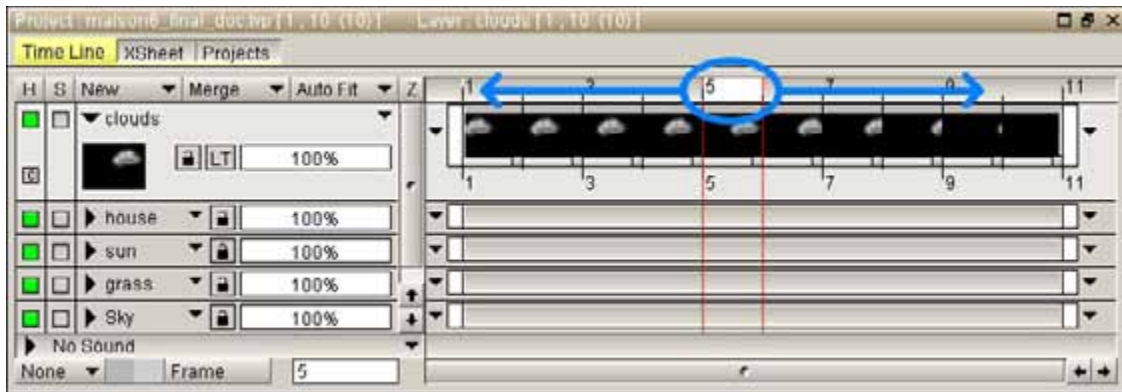
The ▾ icon in the top right hand corner of the current project window is used to *hide/display* the viewing commands described previously.

If required, it is possible to display some of these buttons in a separate window referred to as *Remote control*, which is accessible via the *Windows* main menu. The buttons containing numbers are used to define the play frame rate (in frames per second).

Other movement methods

You may use the timeline or project window to move within the project. To do this, just click and slide on one of the rectangles shown below :






If you use the left mouse button, you change the image.

If you use the right mouse button you return automatically to the original image when releasing the button.

The Navigator



The other buttons, specifically used for navigation on the project surface, are found in the *Navigator* window which is accessible in the *Windows* main menu.

This panel also allows you to have a low quality preview of your sequence/animation which can be useful by pressing the  button.

- * Button *N* shown above is used to open a new project window.
- * The red rectangle indicates the current display area in your window relative to the full image.
- * The *Display* popup menu is the same as the one described in lesson 3 page 16.

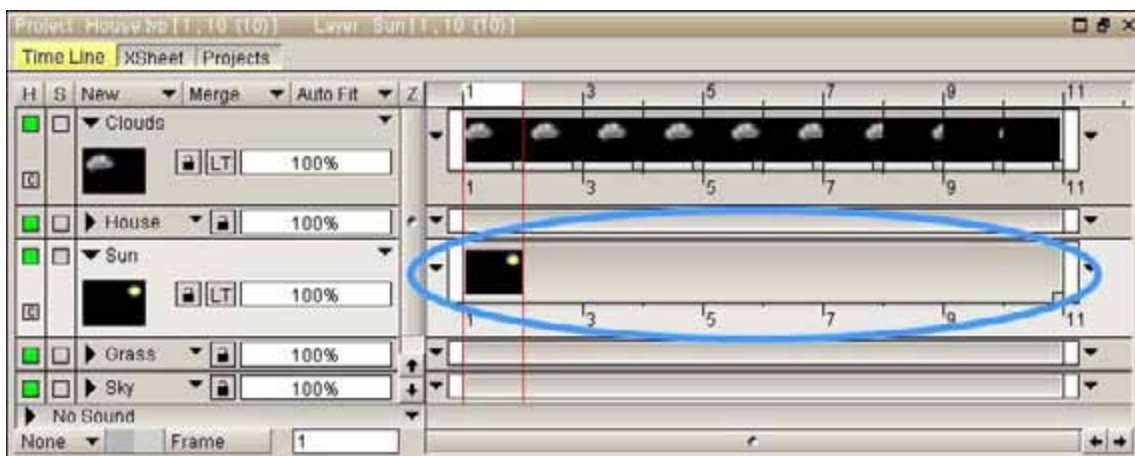
Transform an *Image layer* into an *Animation layer*

We will now make the sun move.

It is not necessary to create a new animation layer. TVPaint Animation Pro allows you to transform an image layer into an animation layer.

This option is again offered in the menus reserved for layer handling.

As soon as the sun image layer is transformed into an animation layer, its icon will appear in the timeline.




We obtained here an *instance*. This concept will be deeply studied in the lesson 6.

All you need to know here is that the first image is identically reproduced several time in the timeline.

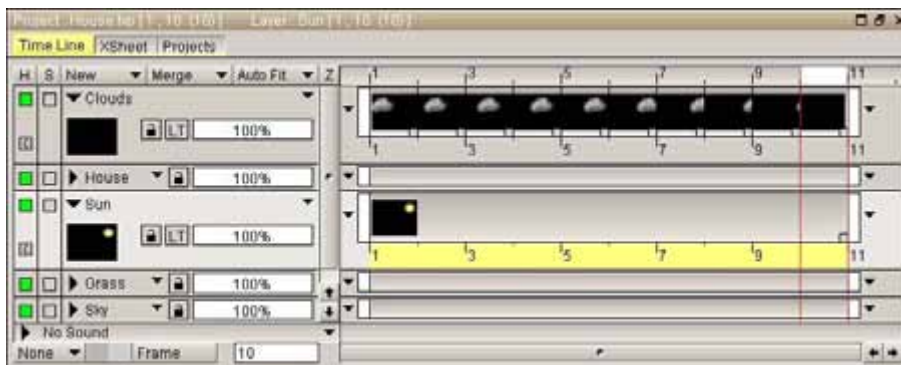
Select and erase the contents of the images in an *Animation Layer*

Select the sun as current brush. As with the cloud, it is now possible to make the sun move up in the sky and leave the screen.

However, before using the brush, the sun must be erased in every frame of our *sun* animation layer.

This may be done with the  button on the main panel for all images one after the other, but this may be too time-consuming when working on long animated sequences.

The trick is to select all images of the layer using the option *Select all* in the contextual menu (keyboard shortcut [Ctrl+A]). Your timeline must be displayed as shown below: a light yellow rectangle is present underneath the selected images.

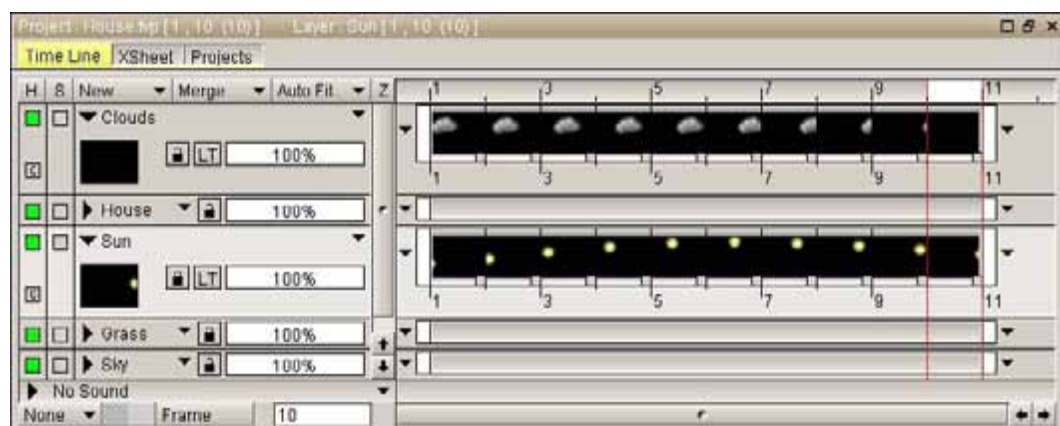
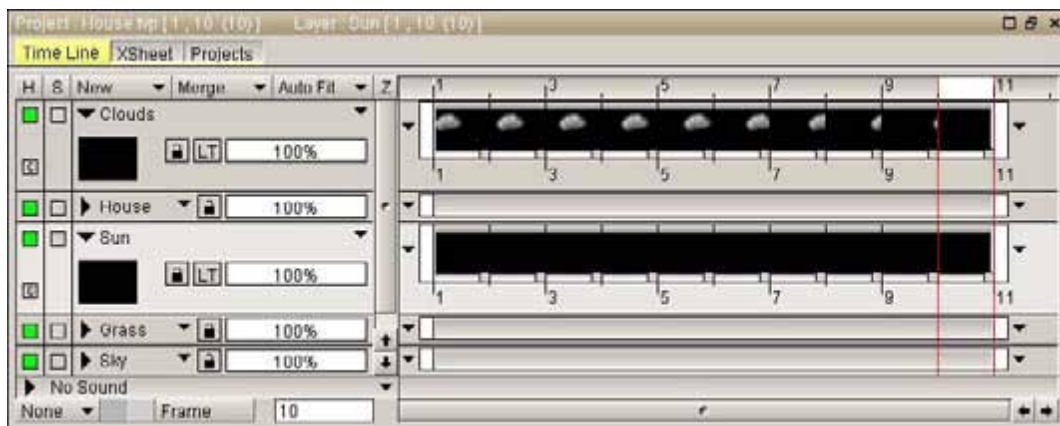


Pressing the  button will erase the contents of all selected images in the layer.



It is possible to only select a part of the layer by clicking on and sliding from the first image to be selected to the last.

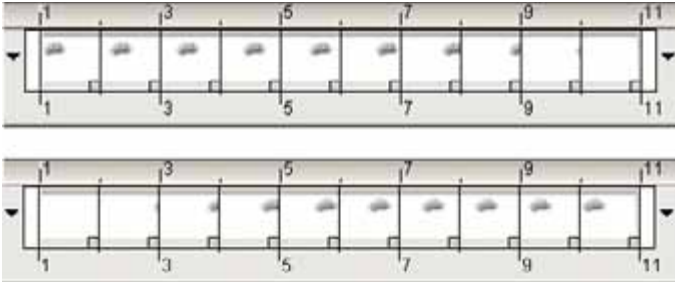
Our *instance* has been replaced by empty images. you may now make your sun move, as you did for the cloud.



Flip the images of an Animation layer

Some options may speed up your work considerably.

The option named in the title of this paragraph is used to flip the images of a layer in time. It is only available in the layer menu after having selected the images to be flipped in an animation layer of your choice.



This is what happens to our cloud layer: the last image is now first, the last but one is second, and so on ...

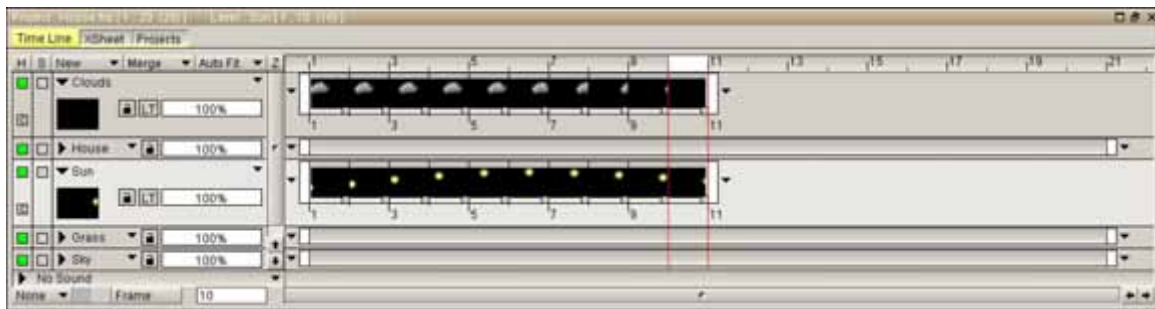
The cloud now moves from right to left.

Move the layers in the timeline

As with the image layers in lesson 3, it is possible to move the animation layers in space. For example, you may move the cloud behind the house or the sun in front of the cloud (in case of a very high cloud, obviously), etc.

But this is not all: image layers and animation layers may also be moved in time.

Increase the image layers to 20 frames and the following timeline will appear :



Now click on any image of the «cloud» layer and slide the mouse to the right before releasing the button.

You have now moved your layer in time. Do the same with the «sun» layer.

In the screenshot below, the «cloud» layer will only be shown starting from the tenth image of the animation and the «sun» layer starting from the fourth image.



The range in number of frames (or in seconds, if you are in *TimeCode* display mode) located at the top of the timeline offers a global identification system, enabling location of each layer in relation to the others within the current project.
The ranges under the frames of a layer (in number of frames or *Time Code*) only refer to these layers.

More details

Show, hide the icons

It is possible to show or hide the icons of an animation layer in the timeline. You will find this option in the contextual menu of the animation layer (the first and last image are, however, always displayed).

Similarities with *Image layers*

Many of the details regarding the image layers discussed in lesson 3 are also valid for the animation layers:

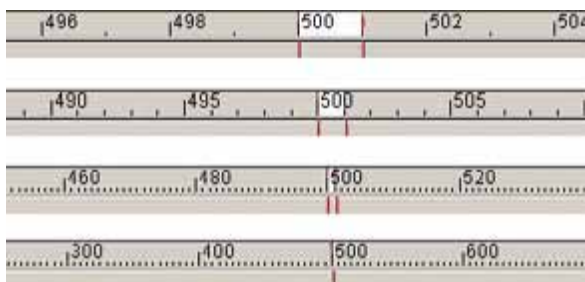
locking, duplication, reduction of layers as well as assigning a color work exactly in the same way for the animation layers.

The reference images for the masks are those located in the same temporal position as your current image.

The *Auto Fit* option in the timeline

When using a very long animation layer, it may be discouraging having to use the sliders continually to only view a section of the timeline.

Fortunately it is possible to modify the timeline scale :



Click and hold the **Z** button of the timeline to modify its display (stretch or increase the icons from the current image depending on the left or right movement of the mouse or trackball).

The *Auto Fit* popup menu may be used to adjust the size of the icons in the timeline in order to view the entire project, current layer, current image, current selection or keys.

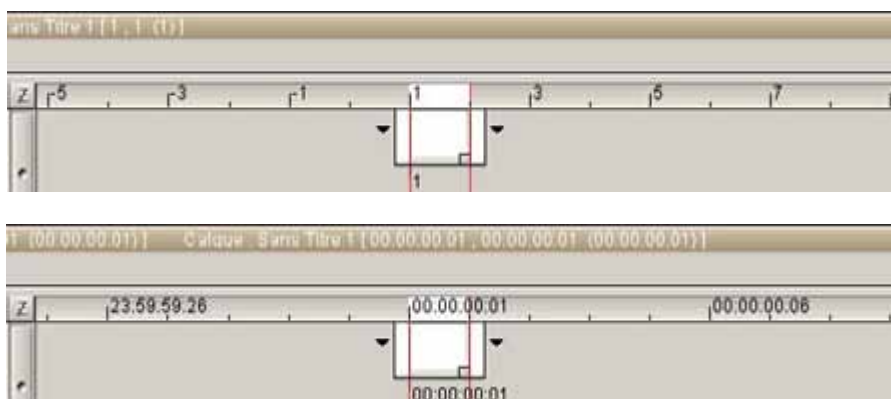
Start frame, negative images



If you take a closer look at the timeline, you will see that our project starts at image 1 or the time:

0 hour, 0 minute, 0 second, 1 frame (in *Time Code* mode).

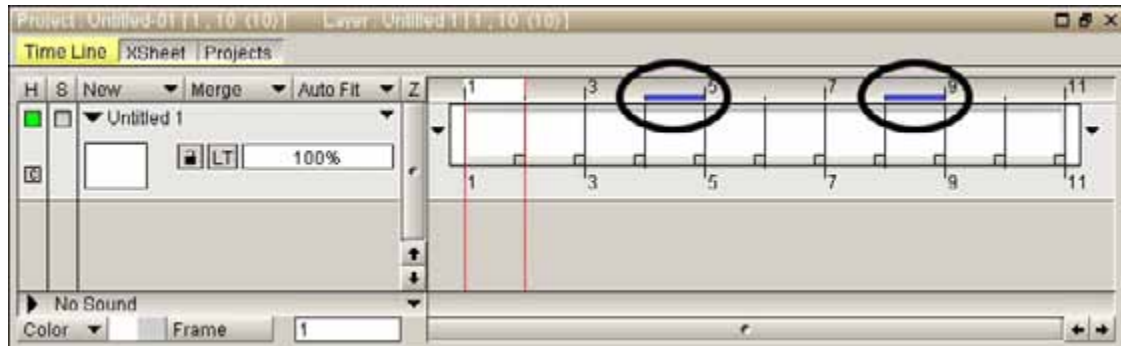
It is possible to modify the start values for our project using the *Start image* option in the *Project* menu (enter the value required in the corresponding numeric field).





You will note that it is possible to place your layers before image 0 in the timeline using the [Shift] key while dragging the layer to the left. You will therefore obtain «negative» images in the timeline or time values close to 23 hours, 59 minutes, 59 seconds.

Using the *Bookmarks*



It is possible to place *Bookmarks* on the images of your animation layer (circled in black above) using the corresponding option in the *Edit* main menu.

Once the *Bookmarks* are placed, the keyboard shortcuts [Shift+Ctrl+←] and [Shift+Ctrl+→] enable you to move to the closest *Bookmark* to the left or right of the current image. Finally, the keyboard shortcut [Shift+Ctrl+↑] creates a *Bookmark* for the current image or deletes the *Bookmark* if the current image already contains one.

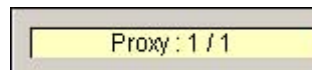
This option provides fast access to key images in your animation without having to modify the zoom factor of your timeline and/or use the sliders.

The *Preview settings*

The *preview settings* are used to configure the way your computer and program interact to play your animations.

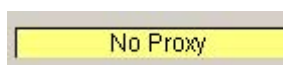


You may open the *preview settings* panel shown opposite via the *Windows* main menu or by clicking on the preview progress bar in the tool bar.



Three pre-view modes are available in the *Preview* popup menu :

* The *Real time* mode respects the duration of your animation when viewing it. It depends on the processing power of your computer. If the computer is fast, all images will be displayed at the framerate chosen by you. In the contrary case, some images are not displayed in order to respect the framerate. In real time mode, the progress bar displays *No proxy*.



* The *Proxy* mode uses periods of less activity in the program to carry out a pre-calculation for viewing. If, for example, you spend ten seconds without drawing and without using any program options, this time will be used to prepare some of the images for viewing.

* The *Render* mode does not carry out the calculations required for viewing during viewing. It pre-calculates the viewing in advance, just before playing. This compensates the inconveniences encountered in *Real time* mode for slower computers (jerking, image jumps, etc.) but requires a lot of disk space and time for this calculation.

The progress bar below shows how many images may be viewed within the project.



If you modify several images at the same time in *Proxy* mode (for example by erasing a layer), the viewing calculation will be re-started for the number of images concerned.



If you start viewing before the calculation process is completed, only some of the images may be viewed in *Proxy* mode. The other images will be viewed in *Real time* mode.

In TVPaint Animation Pro, the preview ratio quality is automatically set, depending on the data rate of your temp drive.

In other words, the data rate automatically change the size ratio of your preview to play it as well as possible regarding the playback frame rate of your project.



The *temp* drive is the drive containing the *temp* folder that can be chosen in the preference panel. (See lesson 1.)

You can use the *test* button to determine the data transfert rate of your temp drive. The quality ratio will be reduced if you decrease the data rate value.



It is not advised to set a higher value than the one TVPaint Animation Pro computes when you click on the *Test* button. If you do so, the quality ratio will be increased but the sequence won't be played fluently anymore.

The *Show TC* button is used to display the time code during pre-viewing.

The *Play all* button forces the program to display all fields and images during viewing even if this affects the display rate of the chosen images.

The *Flip Book* text field enables adjustment of the number of seconds to play on either side of the current image when the **Flip** button is pressed in the project window (see page 6).

The *CutBrush* tool options



If you select one of the four brush creation icons in the main panel, the *Cut Brush* panel appears in place of the tool panel.



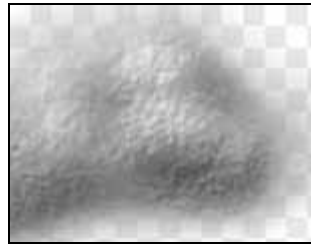
You may:

- * Create a brush by deleting at the same time the area in which it is located on the screen (*Cut* option in the popup menu).
- * *Smooth* the cut brush (see lesson 3: smooth the contours of a surface).
- * With the *Keep* option you may keep the previous brush handle (refer to the following section to study the various handles available).
- * Remove as many transparent pixels as possible around the brush (*Optimize* option).
- * The *Display* option is used to cut your brush through the visible layers. This is referred to as deep cut.

Below, the sun, cloud and sky are placed on three different layers. The current layer is the cloud layer:



Area to be cut



Brush obtained
without deep cut

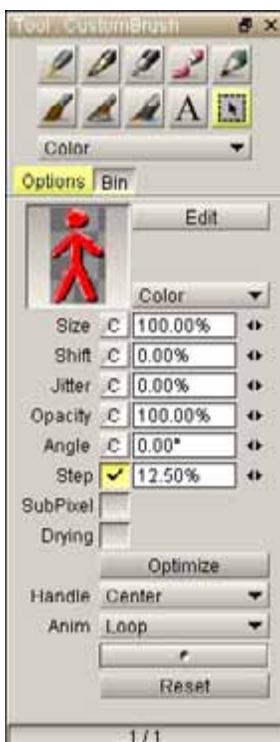


Brush obtained
with deep cut

Edit brush options

Once a brush is cut, it is possible to use it as such. Numerous parameters are available. You may :

- * Use the brush in *Color* mode. In this case the color of the pixels is not modified.
- * Use the brush in *Alpha Stamp* mode: only the opacity of the brush pixels is taken into account, their color becomes the A color.
- * Use the brush in *Luma Stamp* mode: the color of the brush pixels varies from A color to B color depending on the original luminosity of the colors of the brush pixels.
- * Use the brush in *Hue stamp* mode: in this case, the hue of the brush pixels becomes that of A color (the luminosity of the pixels is preserved).
- * Use the brush in the *Alpha Stamp* and *Alpha Max Stamp* modes (see lesson 7 for details about those modes)
- * Modify the global *Size* of the brush.
- * Modify the *Jitter* of the brush.
- * Modify the *Opacity* of the brush.
- * Modify the *Angle* of the brush.



- * Modify the *Step* between two applications of the brush on the screen. This option enables drawing in a discontinued manner.

- * The *SubPixel* option is used for more precision during drawing.

- * Use the *Shift* option. It allows to distort the current image in the direction of your stroke. It is often used with the opacity parameter set to 0%. (see below)

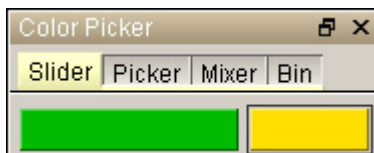


When using the *Shift* option, the *Alpha Stamp* and *Alpha Max Stamp* modes are not available.

- * Use the *Drying* option (see end of lesson 3).
- * *Optimize* the brush: i.e. re-align the brush to conserve less transparent areas around the brush.
- * Change the *Handle* of the brush: in other words, change the position of the cursor in relation to the brush which is centered by default.
- * *Reset* the brush settings.
- * The *Anim* option will be discussed later.



The state of the *SubPixel* option shown above will be kept if the *Keep* button is enabled when the brushes are cut.



The illustrations below show the various concepts described on the previous page...

Let's take a look at the colors A (R = 5, G = 255, B = 8) and B (R = 255, G = 183, B = 11) below :

An example of the various brush application modes :



The brush application modes will also be studied in lesson 7 in the chapter :
« Use of the brush as a drawing tool »



shift = 100 / opacity = 100



shift = 100 / opacity = 0



shift = 100 / opacity = 15



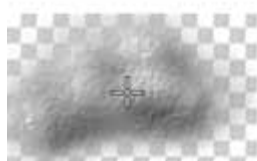
Normal brush



Non-optimized brush



Optimized brush



Centered handle



Handle top right



Handle custom-placed

Traditional drawing modes are applied to the brushes and sometimes provide interesting results:



Original brush
(the white pixels
are opaque)

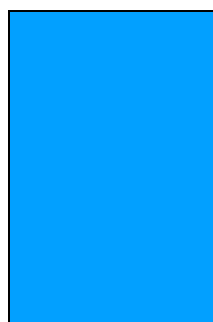


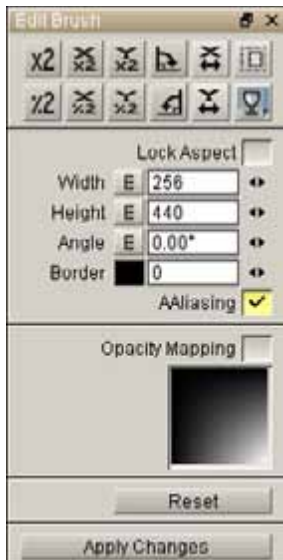
Image on which the
brush will be applied



Application in
Multiply mode



Application in
Screen mode



Let's talk about the *Edit* button: it is used to display the panel shown opposite. The various buttons from left to right and top to bottom have the following functions:

- * double the size of the brush.
- * double its width or height.
- * turn the brush +90°.
- * flip brush on X axis.
- * optimize the brush.
- * cut brush size in half.
- * cut brush width, height in half.
- * turn the brush -90°.
- * flip brush on Y axis.
- * replace the transparent areas with B color.
- * lock the width/height aspect ratio.
- * modify the size of the brush numerically or in the project window.
- * rotate the brush to an angle of your choice.
- * add a border to the brush (you may choose the color and thickness of the border).
- * anti-alias the brush when modifying size and angle.
- * use the opacity map (see lesson 3).
- * reset all settings to zero and recover the original brush.
- * validate the modifications and use the new brush.

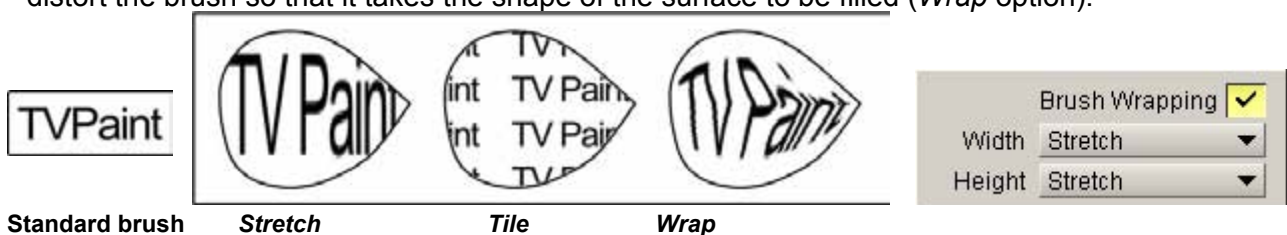
It is possible to obtain all the configurations shown below and many more !!!



Floodfill using a brush

The *Filling shape* panel appears when you decide to draw a filled surface or floodfill a surface on the screen. This panel enables the use of the brush as a floodfill pattern. The *Brush Wrapping* button enables this function. There are several methods available. Following the horizontal and/or vertical axis, you may :

- * apply the brush while adapting its size (width and/or height) to the surface to be filled, without distorting the brush (if necessary, the whole brush will not be visible) (*Stretch* option).
- * apply the brush at regular intervals without distorting it (*Tile* option).
- * distort the brush so that it takes the shape of the surface to be filled (*Wrap* option).



Note that for this example we used a brush created with the *Text* tool which will be discussed in lesson 7 but the example applies to all types of brushes.

The notion of *Animated Brushes*

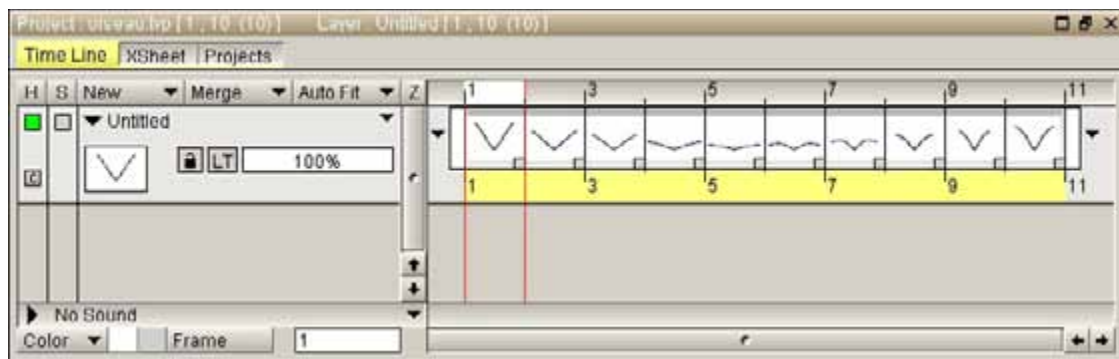
Using the *Deep cut* option which was displayed during the brush cut, we saw that it is possible to cut a brush in space, several layers deep ...

It is also possible to cut a brush in time: this is referred to as *animated brush*.

We will study this notion in detail using examples.

Example 1: We'll put a finishing touch to our animation by adding birds.

* Create an *Animation layer* of 10 images, then create a bird with a different wing position in every image of the layer (see timeline below).



- * Select all the images of your layer.
- * Carry out a rectangular brush cut in a size similar to that of the image.
- * TVPaint Animation Pro will ask you if you wish to cut an animated brush via a small window.
- * Answer yes.

You have just created your first animated brush. We will soon be able to use it:

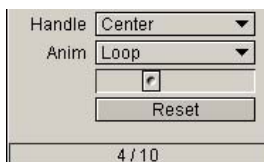
- * Delete the content of the layer you have just created.
- * Use the Edit brush option to reduce the size of your animated brush.
- * Let's now look at the short animation created previously (refer to the first chapter of lesson 5 explaining how to save your projects) with the sun and cloud.

Check that you are working in color mode then click several times anywhere in the blue sky. This is the result:



The birds you have drawn before have become your brush «each in turn» as you place them on the screen!

A few words on parameter setting for animated brushes:




* At the bottom of the *Tool : Brush* panel you will find the number of the image currently used.

* The *Anim* popup menu of the *Tool : Brush* panel controls how the images appear.

The images in your animated brush may appear in various ways :

- * None.
- * Once.
- * Start&Once,
- * Loop.
- * Pingpong.
- * Random.
- * Stylus pressure.

- * Stylus speed.
- * Stylus direction.



All other options and parameter settings for the brushes studied previously (modification of size, opacity, direction) also apply to animated brushes ...

Example 2 : Reproduce an animation.

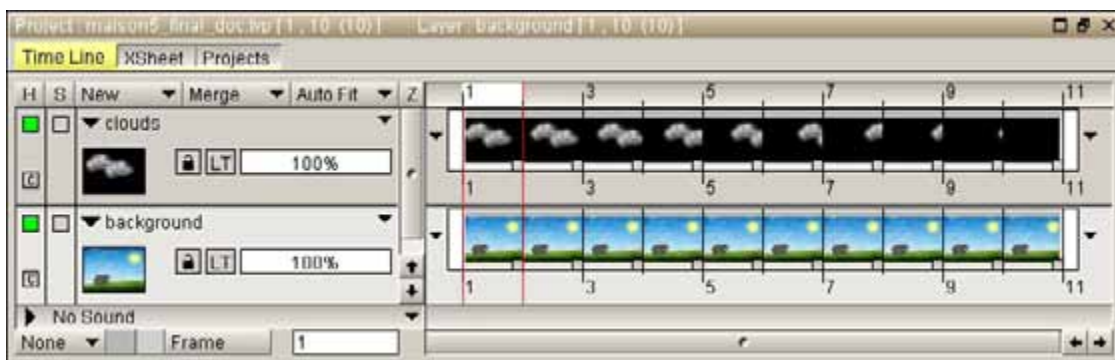
Let's now look at the short animation created with our sun and cloud but without the birds.

* We start by merging all layers except the «clouds» layer and rename the new layer. You will obtain the following timeline:



- * Select all images in your «clouds» layer, then cut a rectangular brush in roughly the same size as the red frame shown above. You just created a new animated brush.
- * Place your « animated brush of the cloud » in the free sky area, just above the house.
- * Press the *Undo* button: the cloud disappears.
- * Check that the « animated brush of the cloud » is applied in mode *Start & Once* from image 5.
- * Select all images of the « clouds » layer.
- * Press [Enter].

You will notice that the images of the animated brush are applied in the given order to all images of the current layer: a second cloud now moves from left to right ...



Did you understand these two examples ? If yes, you can now easily make the wings of a bird flap wherever you want to ...

Lesson 5

Handling TVPaint projects

In this lesson you will :

- Learn how to handle TVPaint Animation Pro projects: load, save, import, export, etc...
- Study the notions of *Templates*, *Dependencies*.
- Discover the *Video Grabber* Panel.
- Learn how to use the project management panel.

Introduction

In lessons 3 & 4 we studied the concepts of *image layers* and *animation layers* as well as their temporal and spatial specificities.

What we refer to as a *TVPaint Animation Pro project* (or simply *project*), is all image, animation or Xsheet (see lesson 8) layers in a timeline (whether created by drawing, scanning or any other method) with all associated options: global opacity, pre- post- behavior, FX stack (see lesson 9), number of images per second, position in the timeline, resolution, etc.

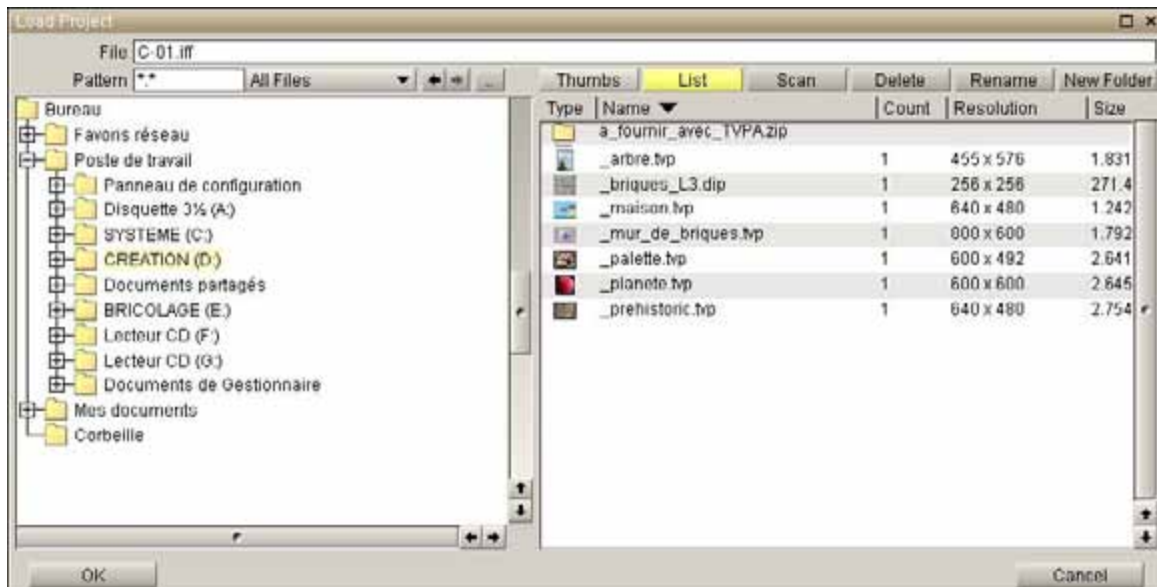
Save a project

In lesson 1 we saw how to create a project with the parameters of your choice.





After having worked with tools and layers (lessons 2, 3 and 4), you may wish to save your project for later use. To do this, use the *Save project* or *Save project as* functions in the *File* main menu. *Save project* (keyboard shortcut [Shift+S]) allows you to save the project under the current name, whereas *Save project as* asks you to choose a new file name for your project. This function allows you to easily duplicate your project as you progress with its creation.

Use the requester

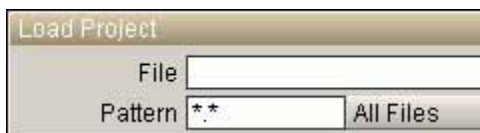
A file explorer then asks you to select an access path and file name for your project.



This window is laid out as follows:

- * The text field at the top of the window allows you to enter the name under which the file is to be saved.
- * The second text field just below the first is used to select the type of files to be displayed in the right section of the window.
- * The popup menu to the right of this field is a shortcut used to select the file types of your choice. In the default setting, all file types are displayed (extension .PNG .BMP .JPG ...). TVPaint Animation Pro projects have the extension .TVP.
- * The left section of the window contains the directory path. When necessary, the sliders (and fingerwheel of your mouse) may be used to scroll through the list of folders available for storage. A right-click on an item in this list opens a contextual menu offering access to *Open*, *Delete* and *Rename* functions.
- The  and  buttons are used to display or hide the content of your storage supports, folders or sub-folders.
- * The  is used to return to the parent folder.
- * The arrows  are used to scroll through the history of selections in the file explorer. In this way, you may quickly find the folders in which you last saved your work.

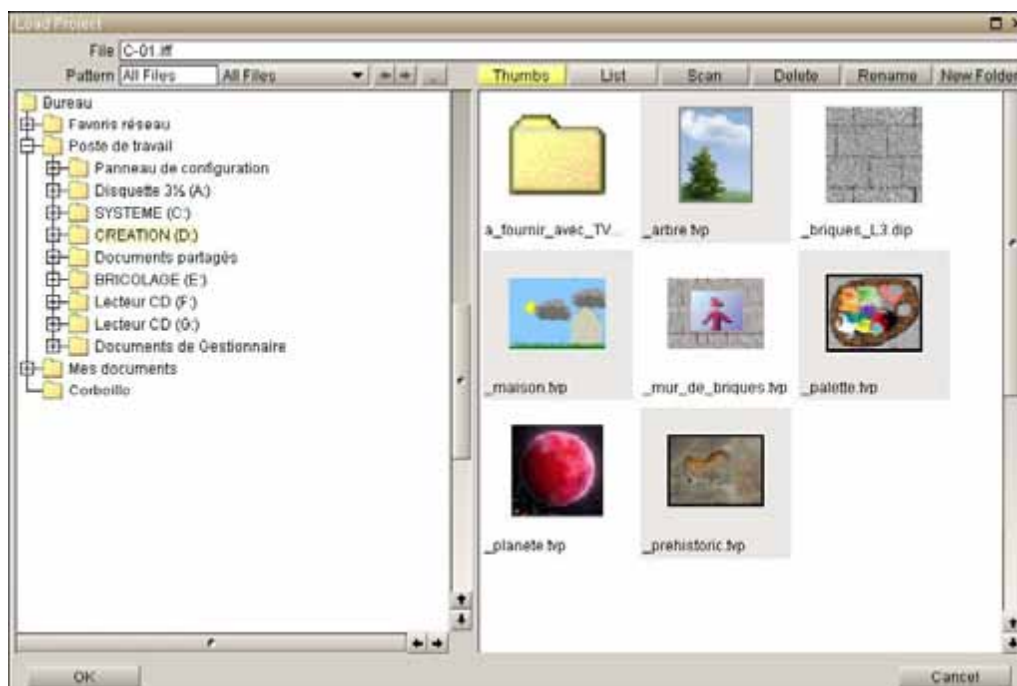
- * The right section of the window displays the files contained in the folder you selected on the left side of the window.
- * You may choose to display thumbnails of your files (button *Thumbs*, button *Scan*) or display a list containing information relative to your files: type, name, count, resolution, time, size, date of last save (button *List*, then button *Scan*). Note that some data is not taken into account for all file formats.
- * It is also possible to delete the selected file, rename it or create a new folder using the buttons *Delete*, *Rename* and *New folder*.
- * Once you have selected the file or folder you require, click on *OK*.
- * To quit the file requester and ignore all operations, click on *Cancel*.



When using the second text field, the question mark is considered a random number or letter, whereas the asterisk is considered a complete random word.

For example :

- * Enter « *.jpg » to display all image files of the type jpg in the right section of the window.
 - * Enter « dessin003?.jpg » to display all files named dessin003 followed by another character and the extension « .jpg ».
- Therefore files between dessin0030.jpg and dessin0039.jpg will appear whereas dessin0020.jpg or dessin0040.jpg will not.



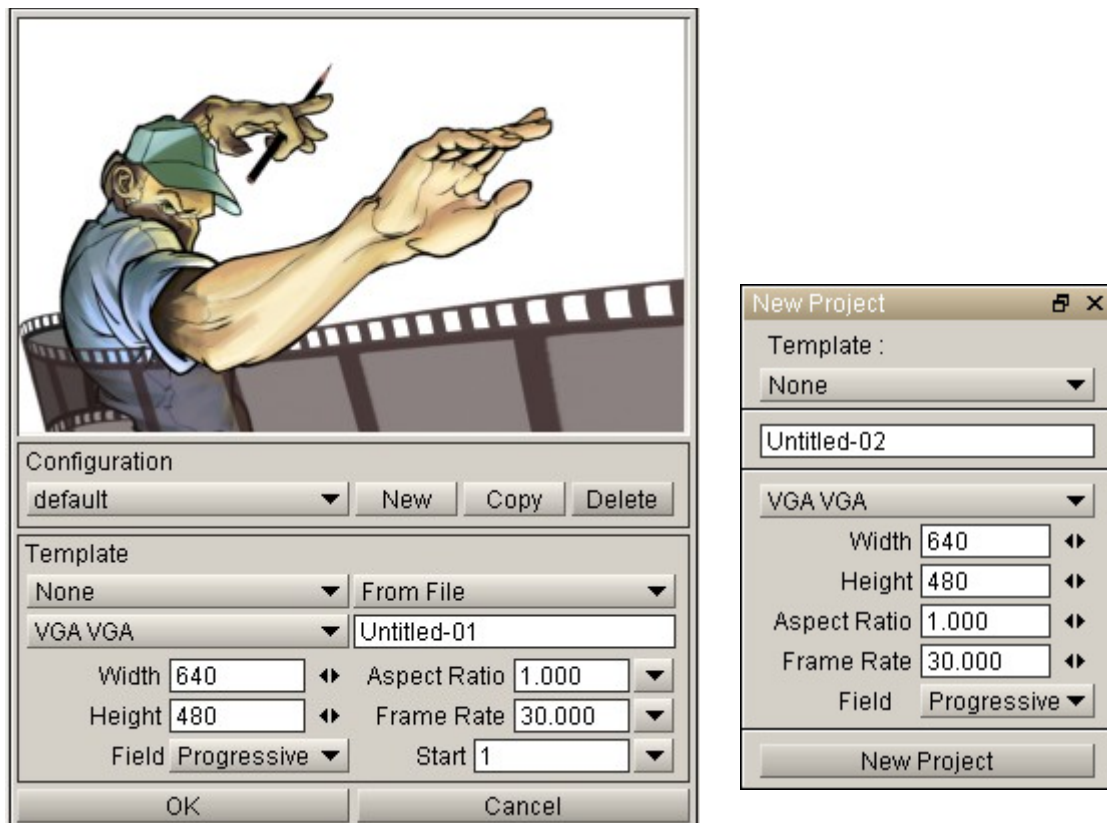
Above an example of a file requester with projects displayed in the form of thumbnails.

Save a Template



A *template* is a blank project using a predefined resolution, speed, aspect ratio and number of layers and images.

It is possible to save a *Template* using the dedicated option indicated in the *File* main menu opposite (the template will have to be given a name).



In this way you may select the *template* you just created when a new project is started (when starting up or using the program).

You may also use one of the many predefined models.

Load an existing project

To load an existing project from the data storage support, simply press the keyboard shortcut [Shift+L] or the *Load* option in the *File* main menu. The file requester will then ask you to select an access path and file name.

Now that you know how to use the requester, load the file « running kid_2.tvp »

Folder **C:/program files/TVPaint Developpement/TVPaint Animation Pro/** for Windows users.

Folder **Applications/TVPaint Animation Pro** for OS-X users.

If the project loaded is too big, too small, possesses too many images or has an incorrect pixel ratio, you may modify it.



A list of files previously loaded with TVPaint Animation Pro is available in the *File* main menu. Simply click on the name of one of these projects to load it again.

Modify a project

The option *Modify project* is accessible in the *Project* main menu.

The latter opens the panel illustrated below:

* The project properties are indicated on the top left-hand side of the window and include: *Project name*, *Width*, *Height*, number of frames per second (frequency), *Pixel aspect* and *Field* options. Bottom left you will see the future size of your project, after modification.

* Just below, a popup menu is available in which you may select the predefined format you require, corresponding to the format you will obtain after modification.

It is possible to modify a project originally in VGA format, to obtain a project in NTSC format.



* The numeric fields located under the popup menu change according to your choice in the predefined formats menu.

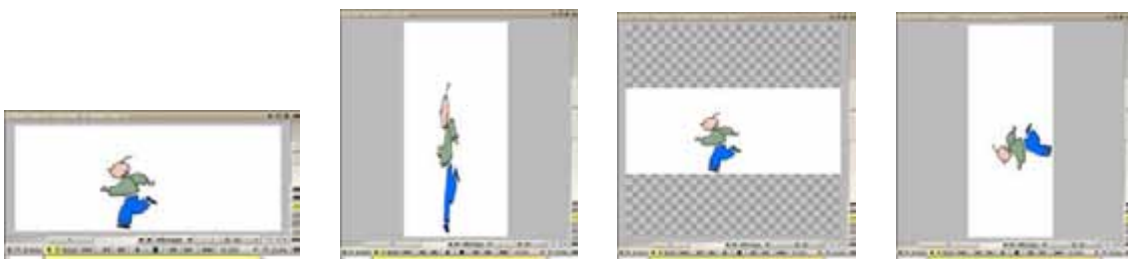
Of course, you may modify your project for your own format (for example to create an animated gif on a website). All you have to do is modify each option manually: *Width*, *Height*, *Frame rate*, *Aspect Ratio*, *Field* (a mini popup menu is available for the parameters *Frame rate* and *Aspect ratio*).

The *Lock aspect* button allows you to keep the width and height ratio of the original project. The *Rotation* parameter is used to rotate the project 90, 180 or 270 degrees.

* Here you will discover the functions of the next five buttons:

By default, when the *Modify project* function is used, TVPaint Animation Pro keeps your original project and creates a new project which is modified according to the parameters you have selected.

- The *Resize to new size* button enables, when checked, the resizing of your original project to a new size.
- The *Correct aspect ratio* button forces the program to respect the original image aspect ratio (this avoids the creation of disproportionate images).



- The *Stretch to new frame rate* button, when checked, increases or decreases the number of images so that your new project has the same duration as the original project.

If, for example, your original project displayed 24 images/second and your frame rate is set to 12 images/second, your project will last twice as long (the number of images is, by default, retained). If the button *Stretch to new frame rate* is checked, some images will be deleted so that the original project and modified project have the same duration.

In the opposite case: original project with 12 images/second, modified to a project with 24 images/second, the modified project will be shorter than the original project. If the button *Stretch to new frame rate* is checked, intermediate images will be added to the modified project to make it coincide with the duration of the original project.

- The two aforementioned examples are similar to the layer's contract and stretch section discussed in lesson 4. The *Time interpolation* button also refers to this function as it imposes layer stretching or contracting with interpolation when the button *Stretch to new frame rate* is checked.
- The *Remove project* button is used when the original project is not to be kept on the screen.



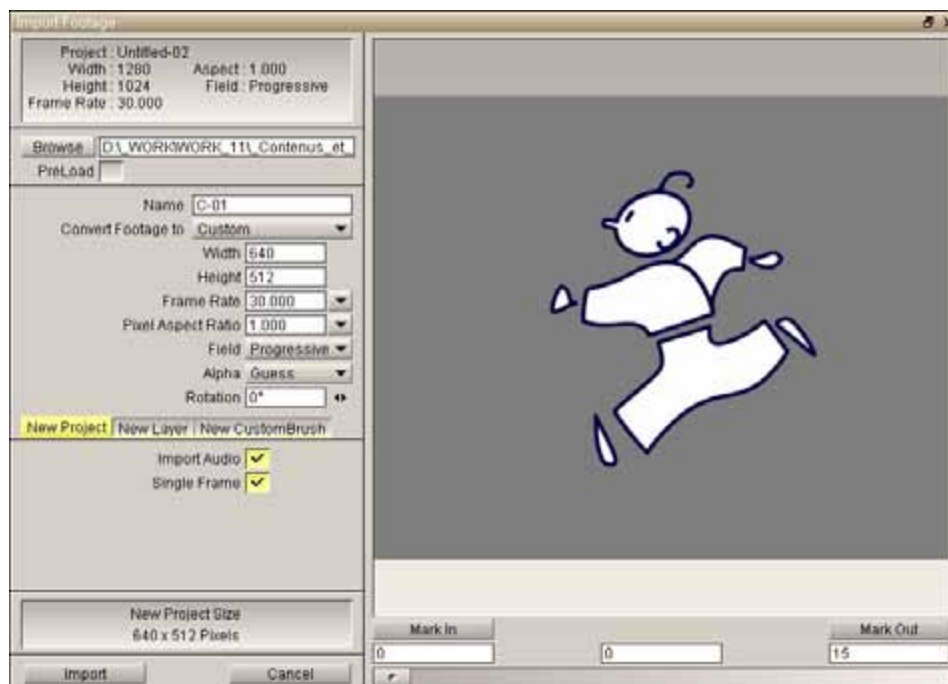
Use of the *Remove project* option is at your own risk as in this case the *Undo* function cannot be used to help you out...

- * The right section of the project modification panel enables selection of the portion of the project which is to be modified. The *mark in* and *mark out* buttons as well as the associated numeric fields will help you select the first and last images of the project to be modified.
- * The central numeric field and slider are used for navigation over the entire duration of the project.

Load an existing image or animation

It is sometimes useful, when working, to load an image, video or animation which has not been saved in a format which manages layers as well as their layout and opacity, etc... (in other words, an animation which has not been saved in one of the formats TVP, MIR or AUR)

In this case, a new panel, referred to as *import footage* panel, appears directly after selection of a file in the requester. This panel is as follows:



This panel is similar to the project modification panel.

Let's assume you have loaded a video file (AVI or MOV)

- On the top left-hand side of the import panel you will find all information relative to the file selected in the requester window (size, frame rate, aspect ratio, etc.).
- These are followed by a text field which indicates the path and name of the file you have chosen.
- The *Browse* button allows you, in case of error, to choose another file in the requester window.
- The *Preload* button will be discussed in the *Dependencies* section of this lesson.

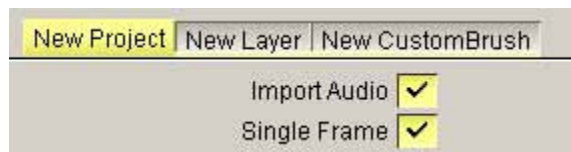
Your video file may be modified when imported to suit your needs: *project name*, *width*, *height*, *frame rate*, *aspect ratio*, *field*, *rotation* may all be modified as we discovered in the previous section.

The *Alpha* popup menu, however, possesses specific options including: *Guess*, *Premultiply*, *No Premultiply*, *Without alpha* and *Alpha only*.

- * The option *Guess* will consider that the *Alpha* value is equal to the maximum RGBA values present in the sequence.
- * The option *Premultiply* refers to the method of calculating each pixel. In this case, each pixel is multiplied by its alpha value which results in the fact that these pixels are calculated quicker than with the *No Premultiply* option.
- * The option *Without alpha* will load your sequence without transparency if it had any beforehand.
- * Finally, the option *Alpha only* will only load a mask of the sequence. This mask will be extracted from the alpha layer of the sequence.

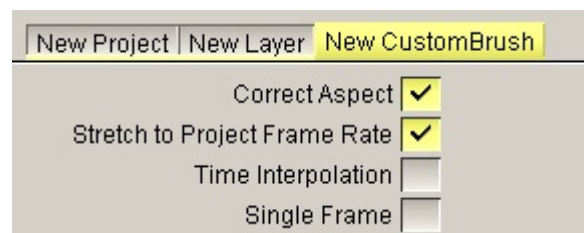
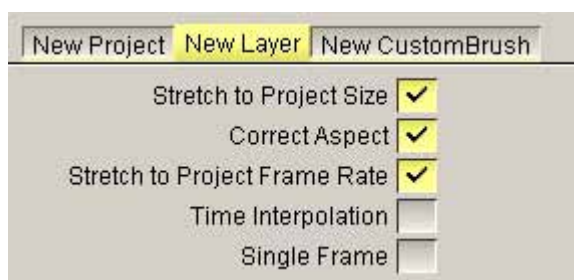
Further down, three tabs allow you to choose the form to be given to your imported video: the imported video may be created either as a new project, a new layer in the current project or as a custom brush (these three options are mutually exclusive).

- * When a video is loaded as a new project, two options are available:



- The video sample loaded will be that located between the two time markers on the right side of the panel. You may also choose to include sound with your video by checking the *Import audio* box in the import footage panel.
- The *single frame* check box, if checked, will create a project with a layer and a single frame: the frame selected in the right side of the panel.

- * When a video is loaded as a new layer, a new set of options similar to those encountered in the *Modify Project* section becomes available. You may:
 - Stretch your video file to fit the dimensions of your current project,
 - Adapt the aspect of your video to that of the current project,
 - Compensate for any possible frame rate differences between your current project and your video by stretching or contracting your video,
 - Choose to stretch or contract with or without interpolation,
 - Create a layer with a single frame (here again, a single frame or large sample may be imported between the mark in and mark out points).



- * When a video is loaded as a custom brush, the same options are available with the exception of the *Stretch to project size* option.

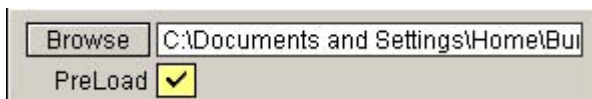


When you load a file in PSD format, a new project is automatically created (no import footage panel is opened) and the image layers are all present in the timeline.



The *Import footage* option in the timeline shown opposite returns the user directly to the import footage panel, *New layer* tab.

Dependencies



The *Preload* button present in the import footage panel is used to choose whether the video footage on which you wish to work is to be read directly from the computer storage support or if it is to be included in your current project.

This option is important for the following reasons:

* Let's assume your projects possess layers composed of non-preloaded video footage.

When loading the same project again, TVPaint Animation Pro will look for the data necessary to display the images, layers and timelines in the external video files. This function is interesting as it saves space when saving as your project does not contain all the images it comprises.



Attention however: if the video file to which your project refers is deleted, modified or renamed, this will have an incidence the next time your project is loaded (the layers and images concerned will not be found...).

* To avoid having a project which is dependent on external videos, you may, when video footage is imported for the first time, preload it immediately. Your project will then be more voluminous when saved, but at least there will be no risk of loosing the data when the imported files are modified.



If you forget to do this, it is possible to preload the files later via the main menu *Project > Dependencies > Load all*. This menu also displays the path and name of files on which your project depends.

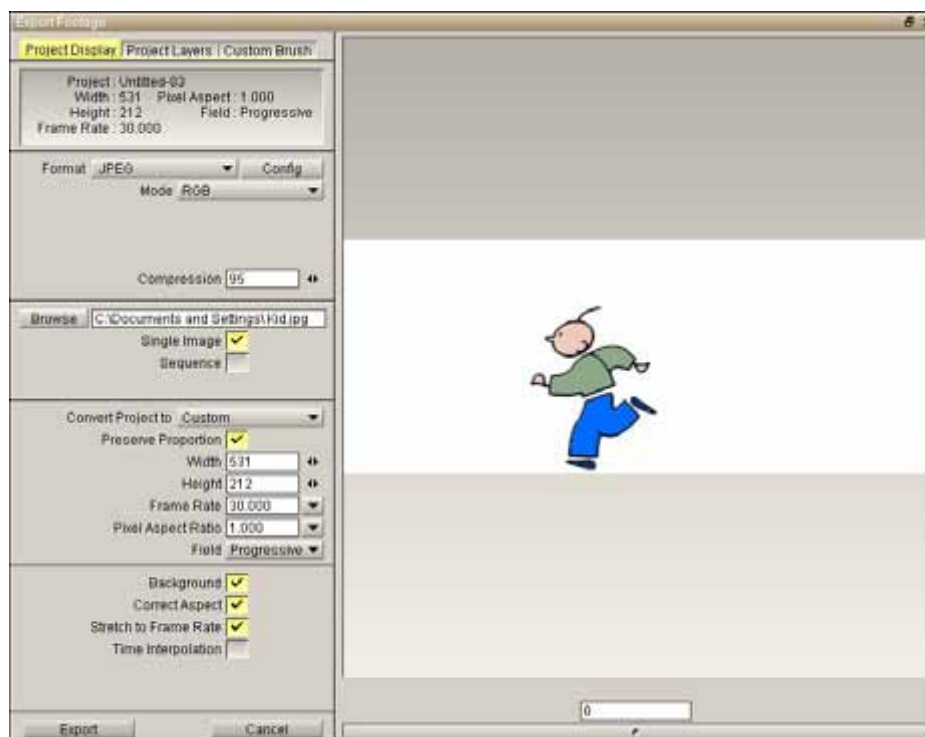
Export files

Saving a project in TVPaint Animation Pro format with all associated layers may require a considerable amount of storage capacity.

Even if it contains specific data relative to your project (opacity, layers, etc...), the TVP format is not a practical solution if you want to share it with your friends at parties or on a website. Use of the dependencies function will render your project smaller, but it is not more practical in the aforementioned cases.

The option *File > Export project to...* is used to convert your project into a format of your choice: animated GIF, AVI or QuickTime file, numbered frames sequence, etc. You will find this very practical as you are able to save your work in smaller files.

This option is present in the *File* main menu. Once selected, the following panel appears:



Its layout should be familiar to you.

You may choose to export an image (or image sequence) from your project while retaining the layers or current brush (possibly animated).

These three possibilities are mutually exclusive.

To export the project image:

* A box on the top left-hand side is the first section of this tab and provides information relative to the current project.

* The second section deals with the export file format:

TVPaint Animation Pro allows you to export your projects in a wide variety of formats: DIP, AVI, GIF, QUICKTIME, FLI, PNG, PCX, SUNRASTER, PSD, TGA, JPG, ILBM, TIFF, FLYER CLIP, D1 RTV, CINEON, SGI, SOFTIMAGE, VPB.

Each format has its own features which are explained in an appendix.

Some are configurable (for example AVI format), others are not.



When the export file format imposes the choice and setting of a video and audio codec, click on the *Config* button to display the corresponding settings panel.

The codecs present in the popup menus and their configuration options are those installed in your operating system.



In order to save a TVPaint Animation Pro project in DVD format, you must have a MPEG-2 encoder codec installed in your operating system.

When required, and depending on the various formats of export, you may need to set the following option parameters:

- Mode

You may choose to export your work in the form of images or a video with a limited palette (8 bits=256 colors), a large palette (24 bits=16.777.216 colors), a palette which takes into account the pixel transparency: 32 bits, a palette with no color data, but only pixel transparency (a mask).

- The palette

In the case of a limited color palette, you may choose to use:

A gray scale palette.

The program palette located in the *Bin* tab of the palette panel

A global quantized palette to be used for all frames of your footage or animation.

A local quantized palette which is modified for each frame of an animation.

- The number of colors

You may also choose a precise number of colors between 2 and 256 (to do this you must first choose one of the two quantized palettes).

- Dither

The *Dither* button is used to disperse the pixels of your animation in order to simulate use of a palette with a lot more colors (technically referred to as «Floyd-Steinberg dithering»).

- Alpha

Options relative to the Alpha function were discussed on page 7.

* The third section of the panel contains several options:

- The *Browse* button and an associated text field are used to enter the name and location of the file to be exported.

- The *Single image* button is used to save the image visible in the right section of the panel only.

- The *Sequence* button is used to save, one at a time, the images located between the *Mark in* and *Mark out* points. The images created in this way are numbered.

By default, the images are numbered as follows:

file_name_1.ext, file_name_2.ext, file_name_123.ext, ...



Including a « 0 » in your file name may help with numbering your images. For example if the first file name is « dessin_000 », the images will have the names dessin_001.jpg, dessin_002.jpg,dessin_354.jpg...

- The *Animation* button is used to save all the frames between the *Mark in* and *Mark out* points in a single file and is available for some file formats (deep, gif, quicktime, fli, avi).

* The fourth section of this panel manages the restrictions and attributes imposed on a file to be exported: width, height, frame rate, pixel aspect ratio, field.

* Several buttons are present in the fifth and last section:

- The *Background* button, when checked, renders all the pixels of your images opaque using the background selected (color, check or none) which is placed behind the transparent pixels of your images.

- The *Correct aspect* button is used to correct the pixel aspect ratio of the images to be exported in accordance with the setting made in the fourth section.

The *Stretch to frame rate* button, when checked, imposes a previously selected frame rate on the file to be exported while retaining the original duration.

- If the aforementioned button is checked, the *Time interpolation* button allows you to decide whether the frame rate (or fields) correction should be carried out by interpolation (smoothing) or duplication (or deleting as the case may be).

To export an animated brush:

The options are the same as those available to export a project display.

To export project layers:

The options proposed are:

- Choose the path and file name
- Choose the file format: TVPaint or PSD (both file formats retain the layers you have created).

Exporting in PSD format :

Earlier we saw that the Export panel contains three tabs: *Project display*, *Project layers* and *Custom brush*. The *Custom brush* tab does not concern us at this point in time as we are only interested in the differences resulting from the choices made in the *Project display* and *Project layers* tabs :

If you decide to export a project in PSD format in the *Project display* tab, you will export an image (or an image sequence) with all the layers of your project in a single image without transparency. The transparent areas will be replaced by the color black.

If you decide to export a project in the form of layers in the same way as your project .tvp, you will have to choose the *Project layers* tab for this export.

If you decide to export a project in PSD format in the *Project layers* tab, you will export an image (or an image sequence) with all the layers of your project in the spatial order, with transparency.

The projects panel

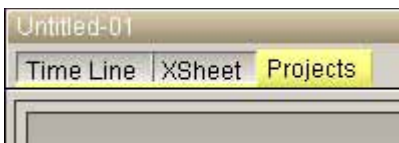
We have already discussed the notion of TVP project in previous chapters. Let's assume that some of them have been already loaded. If you don't have a dual-screen computer configuration, the situation can quickly become confusing on screen. (see below)



In the example opposite, five projects have been loaded and displayed on screen :

- milk.tvp
- city.tvp
- gazelle.tvp
- zoom.tvp
- mpc.tvp

(They are all supplied with the TVPaint Animation Pro CD-rom)



We will remedy to this situation, without closing any loaded project.

To do so, just begin by clicking on the *Project* tab, located near the well known *Timeline* tab.

The project tab is divided in two parts, as shown below :

* On the left part of the tab, there is a window displaying the current project. It displays the current image and the visible layers. The display is automatically updated when you move throughout the timeline.






Below the preview window, you can view datas relating to the current project :

- Name
- Size
- Frame Rate
- Pixel aspect
- Field

You can also add comments to your project. (those comments are saved each time you save a project)

* On the right part of the tab, the thumbnails of the opened / loaded project are visible. You can change the current project by clicking on the thumbnail of your choice.

For each thumbnails, you can use :

- The  button allows to hide the corresponding project
- The  button allows to displays the corresponding project
- The  button allows to close the corresponding project

A contextual menu is available for each thumbnail (see below). The options at your disposal are standard :

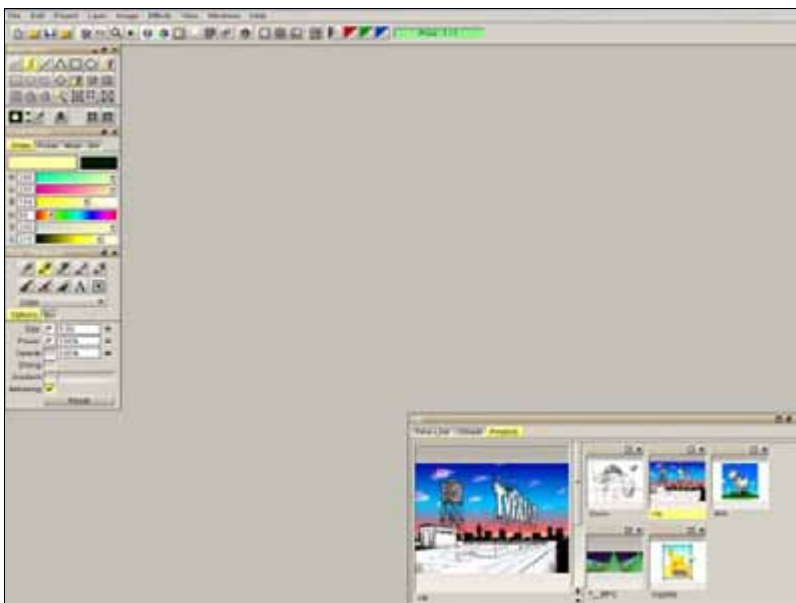
Activate Project	- Activate the current project.
Hide Project	- Hide the current project..
Hide Other Projects <small>Ctrl O</small>	- Hide the other loaded / opened projects.
Show All Projects <small>Ctrl P</small>	- Show all projects.
Close Project <small>Ctrl W</small>	- Close the current project
Modify Project	- Modify the current project.
Duplicate Project	- Duplicate the current project
Save Project <small>Ctrl S</small>	- Save the current project.
Save Project as...	- Save the current project with an other name.
Export Project to...	- Export the current project in an other file format.



You can also use the following shortcuts, instead of the contextual menu :

Hide other projects : [Ctrl + O]
 Show All Project : [Ctrl + P]
 Show the Timeline tab : [Ctrl + 1]
 Show the XSheet tab : [Ctrl + 2]
 Show the Project tab : [Ctrl + 3]

Once you will have mastered the *project* tab, it will be easy for you to turn the situation described on the last page, into something clean, fonctionnal and ready to use :



At this state, you only have to click on a thumbnail in order to begin your work on the corresponding project.

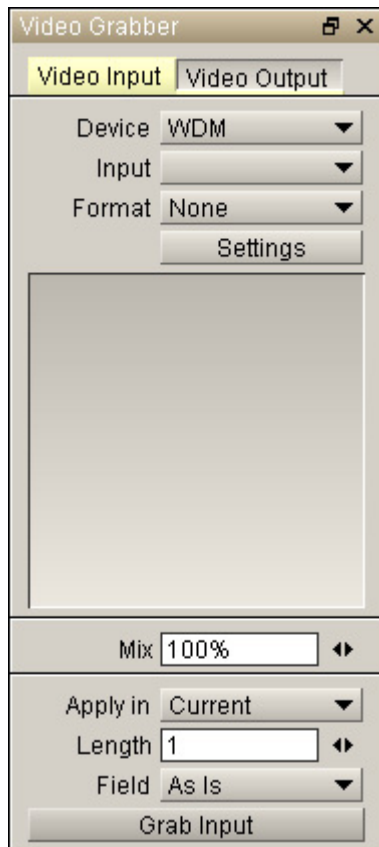


The *project* tab is especially designed for those who need to use at the same time several sequences being part of a same animation. Each sequence is easily available.

Video grabber

It is sometimes useful to refer to video footage to create the drawings necessary for an animation. For this reason, it is possible to enter a video directly into the software. TVPaint Animation Pro is compatible with WDM standard equipment without having to install specific drivers or plugins. For information, WDM devices are Windows Device Manager devices (used by most WebCam and DV format camcorders). On Mac OS X, TVPaint Animation Pro is compatible with QuickTime devices.

To grab video footage, you must first ensure your peripheral device is correctly installed. Then, you must right-click on the *V* button located on the bottom right-hand side of your project window. This action opens the *Video grabber* window:



In the *Video Input* tab :

- * The first *Device* menu allows you to select the type of peripheral device you intend using to grab the video footage.
- * The *Input* menu displays a list of the peripheral devices available and allows you to select the device to be used.
- * The *Format* menu allows you to select the resolution with which your peripheral device will grab the footage which in turn depends on the capabilities of your equipment.
- * The *Settings* button allows you to automatically open the options panel of your equipment and define in most cases certain parameters such as luminosity, frame rate, contrast, etc.

If your device is correctly connected to your computer, opening this window will show what is presently «seen» by the device in the preview window. If you wish to view this video in the project window, left-click on the same *V* button you used to open the *Video grabber* panel.

The value of the *Mix* parameter defines the video footage opacity percentage. This will allow you to continue viewing your project whatever happens.

Finally, the *Apply in* menu allows you to define whether the video grabbed by your peripheral device should be automatically inserted into a new layer or simply added to the current layer.

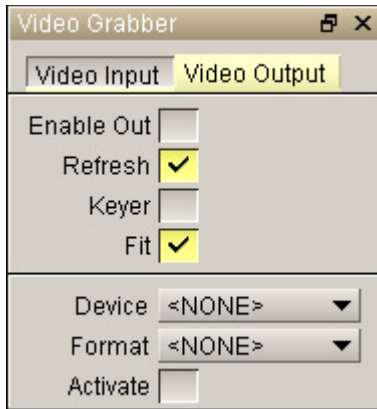
The *Length* option defines the number of frames to be grabbed. If this value is set to 5 and you grab a video, the resulting video will be duplicated on 5 frames of the destination layer. This is very useful as it allows you to monitor the rhythm of your animations.

The last menu is the *Field* menu which is used to define management of your video fields. Four options are available: *As is* keeps both fields, *+Upper first* and *+Lower first* will only use one of the fields, interpolated to correspond to your project window. The *Mix* option is useful for non-interlaced frames and enables reduction of frame flicking.

Finally, this panel is completed by the *Grab input* button which grabs the video each time it is pressed.



A detailed example of animation created with the help of the video grabber and a Canon camera is available in the lesson 18 (chapter « plug-in Canon ») of this manual.



The Video Input tab of the Video Grabber panel allows to manage the visualization of the project window through an external hardware such as television, overhead projector, ...

* The popup menu allows to select the device you will use to display the content of the project window.

* The *Activate* button allows to start the selected external device.

* The *Enable Out* button allows to activate the visualization through your external device.

* The *Refresh* button allows, if possible, to obtain a realtime display on the external device. (by default, the display is refreshed after each stroke)

* The *Keyer* button allows to improve the management of the transparent pixels with some external devices.

* The *Fit* button allows to adjust the dimensions of your current project in order to obtain a better result on the external device.



Please read the appendix of this manual to obtain the complete list of external hardware compatible with TVPaint Animation Pro.

Lesson 6

The steps to create animated graphics

In this lesson you will :

- Learn, one by one, the various stages involved in the creation of an animated drawing using this application. (the scan cleaner, light table, rotative drawing disk and inking options will be introduced)
- Use the Animator Panel.
- Use the scan and print options of the software.
- Learn how to use instances.

Introduction

The aim of this section is to sum up the various steps involved in creating a cartoon using TVPaint Animation Pro and to deal with frequently asked questions. Some steps will be explained in more detail when studying the corresponding effects.

Working with hand-made drawings

Scan and print your images

You may choose to create the images for your future cartoon either traditionally on paper with PEG holes (see below) or more directly in TVPaint Animation Pro.



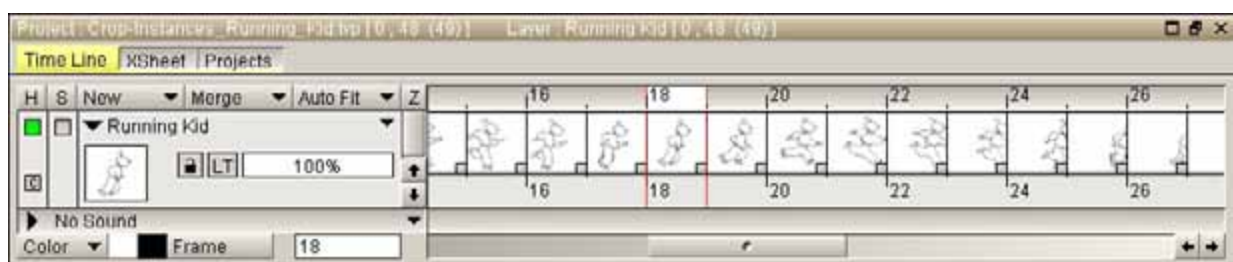
TVPaint Animation Pro works with Twain standard scanners in Windows.

- * The *File > Twain > Select* option is used to choose the scanner you intend using.

- * The *File > Twain > Acquire* option displays the Twain interface of your scanner in order to begin working with the latter.

On Mac OS-X, TVPaint Animation Pro works with ICA standard scanners. Use the *File > ICA > Acquire* option to display the acquisition interface.

In this way, when you scan a set of images, you may either import these images directly after the current animation layer, or in a new animation layer, or simply in a new project.



Inversely, it is also possible to print the content of an animation layer.

The *File > Configure printer* option displays the options available on your printer,

The *File > Print* option opens a new window:

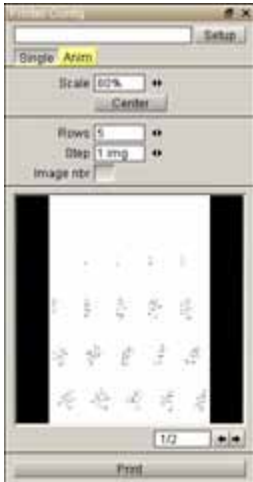
- At the top of this window you will find the name of your printer.
- The *Setup* button displays the options available on your printer.



- The *Single* tab opposite is used to print the current image.

You may adjust the size and position of your image on the future sheet of paper using the click and slide function as well as the *Scale* field.

The *Center* button places your drawing in the center of your future sheet of paper.



- The *Anim* tab offers the possibility to print several images of your animation (merged layers) on the same sheet of paper.

In addition to the image size and position setting options, you may:

Choose the number of columns for your images.

Display the position of each image on the timeline.

Choose every second, third, fourth, etc. image in the *Steps* field.

The two buttons in the bottom right-hand corner of the panel are used to scroll through the various pages to be printed.

Cropping a project

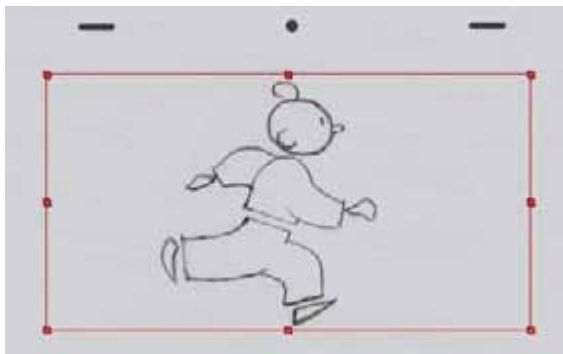


The *Crop* tool is used to define a rectangular area in the current project and to transform the content of this area (including all layers) into a new project.

This is very practical when cropping your animations due to badly defined edges (see example opposite).

The variables *Start X* and *Start Y* are used to define the top left-hand corner of the rectangular area, whereas the next two variables adjust the *Width* and *Height*.

Lock aspect retains the current width/height ratio.



before cropping



after cropping

Clean-up the sequence

Once the drawing has been scanned, it is possible to :

* Delete white or gray pixels to imitate the use of a true animation overlay (this operation is necessary for later coloring as well as for use with a background).



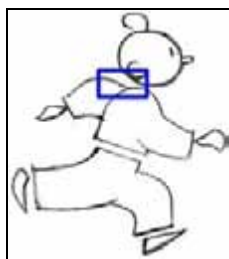
or



will give :



* Clean up your drawings in order to correct rough pencil lines.



(zoom)



>>



Those who have worked with earlier TVPaint Développement software packages use the *Lumakey* effect followed by one of the color effects to remove the (light) gray aspect of the semi-transparent pixels.

New users will no doubt prefer the new *Scan cleaner* effect specially designed to accomplish the two aforementioned operations in a few clicks (even the veterans should give it a go). To use this function, simply open the FX stack (discussed in lesson 9) and add the Color > *Scan Cleaner* effect.

Once all drawings have been scanned, many users wish to delete, add or duplicate images. Sometimes, they also have to transfer complete images or layers from one project to another. It is this traditional, and yet vital, aspect that we will now examine in more detail.

Flip an image

It is possible to flip your images around the horizontal, vertical or both axes.



Original image



Horizontal flip



Vertical flip



Horizontal and Vertical flip

To do this, simply use the main menu options *Image > Modify > Flip (Horizontally, Vertically or Both)* an image or the selected images.

Working directly with TVPaint Animation Pro

The *Sketch* panel

The *Sketch* panel comprises some useful preset tools which will allow you to create and clean sketches, as if you were drawing by hand.

The *Sketch* panel tools are designed for users who work with both computer and graphic tablet and who want to keep their old drawing tools. (pencil, eraser, ...)

Here is a detailed description of the panel :



* The *pencil* icons allow to draw sketches as if you had real pencils. Three colors are available : black, orange and blue. The blue and orange pencils draw with *Behind* mode though the black pencil draw in *Color* mode.

* The *paintbrush* icons allow to paint any pre-existing line into the color. You can turn any line blue, orange or black.

* The *flask* icons allow you to turn your image into blue, orange or black.

* The first serie of erasers allow to erase only the color that is displayed on the icon.

* The *cross icons* delete the color(s) : orange, blue, orange and blue, black while leaving the other colors intact.

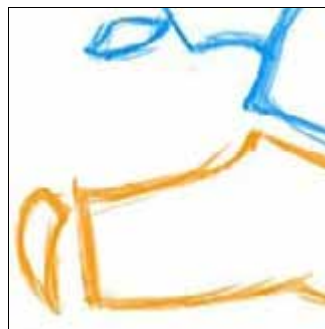
* The *eraser* icons allow to ... erase a portion of the image. The first eraser is small. The second eraser is bigger and smoother.

Now, let's study how to draw and clean a sketch step by step :

* Firstly, erase the content of the current project or open a new project window.

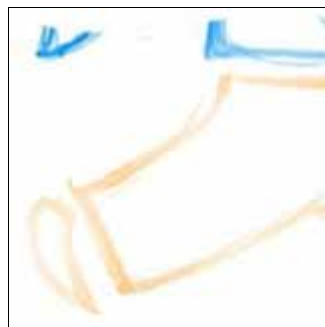
* Use the blue and the orange pencils to rough out your drawing.

The two colors, orange and blue, can help you to differenciate the portions of the image (here, the head and the legs are in orange, the arms are in blue.)



* If you need to do so, use the two erasers at your disposal to refine on our image.

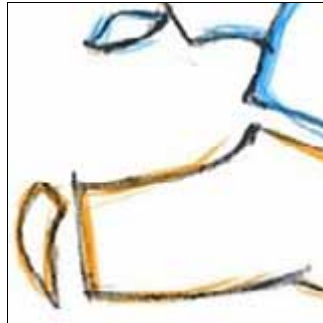
In the example below, the first eraser was used on the head of the character, the second eraser was used on the legs. (the colored eraser will only delete the corresponding colors)



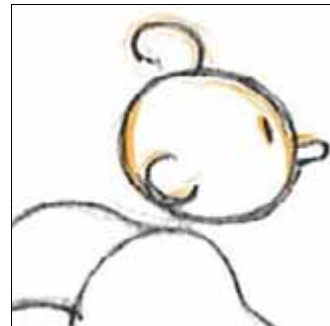
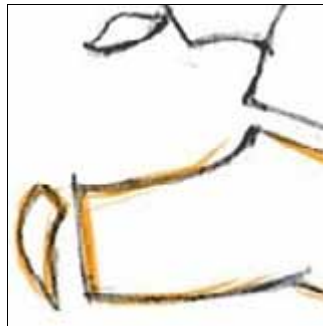


Either you draw or erase, don't forget that the rotative drawing disk can help you work with more precision.

* Once the sketch with orange and blue colors is finished, use the black pencil to clean up the drawing.

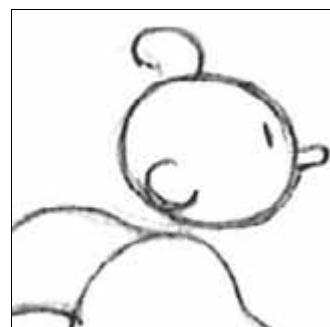


* Now use the *blue cross* icon : you now have deleted the blue construction lines of the arms : only the black lines of the arms are now visible.
The orange and black areas of the image (head and legs) are still visible.



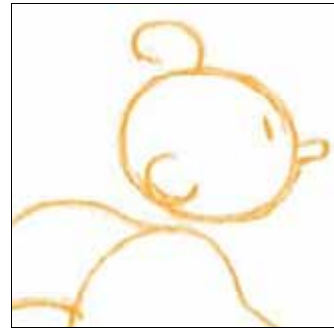
When you use the two colors blue and orange to draw, it is easier to choose whether part of the image should be erased or kept.

* If you use now the *orange cross* icon, only the black lines will stay on the screen. The sketch is more precise than at the beginning.

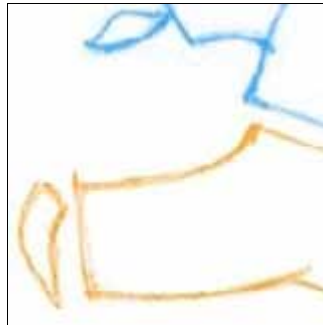


* At this state of the process, you can stop here or continue to have a better result.

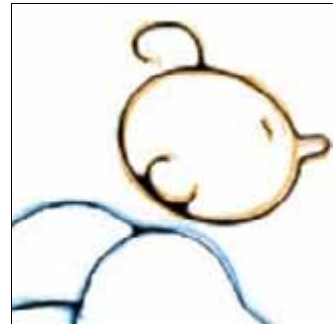
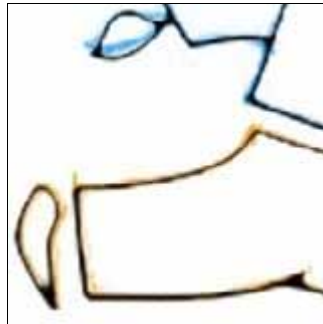
* We have turned here the lines into orange by using the *orange flask* icon. It is still possible to add some lines or to clean the image with the erasers.



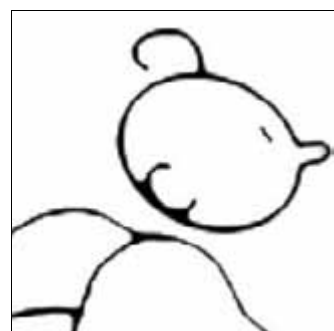
* If you want, you can turn the arms of the character into blue by using the blue *paintbrush* icon.



* Here again, we draw with the black pencil on the colored construction lines.



* Now we can delete the orange and blue construction lines : The image is not rough anymore. (if it is not the case, you can return to the previous steps)



This method is not the only one that can be used with the *Sketch panel* : you can use three colors in a different way or you can use only two colors.

Some artists use one color for the characters and another color for the background landscape ...

It should be easy for you to adapt the *Sketch panel* to your workflow.

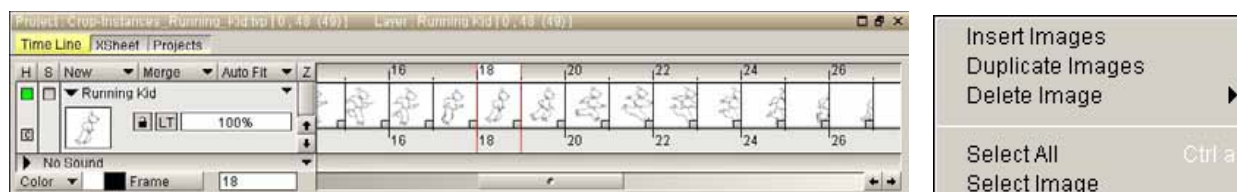
Managing the images of an animation layer



Regarding the images management, it is now clearly advised to use the new instance system. (see the next chapter of this lesson)
The instances features are available since version 8.1.5 of the software.

Insert, duplicate or delete one or several images

To duplicate or delete an image, simply go to the image of your choice in the timeline:



A right click on the timeline opens a contextual menu which allows you to duplicate or delete your image (above).

When duplicating, you will be asked to indicate the number of copies of the current image you wish to create. When deleting, you will be asked to confirm the operation.

To insert one or several empty images in your animation, simply call up the same contextual menu. It should, however, be noted that the new empty images inserted will be placed just behind the current image. The other images of your layer will be shifted accordingly.

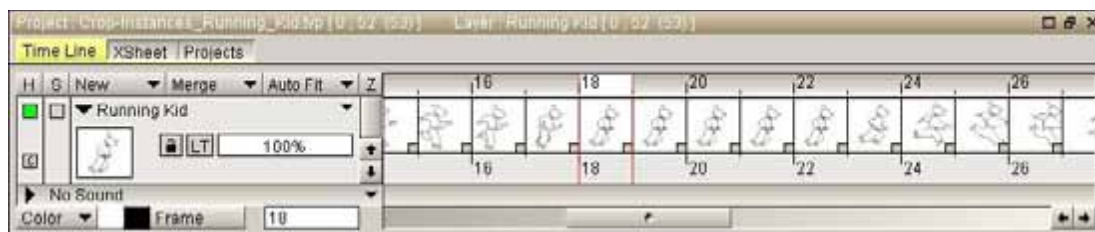
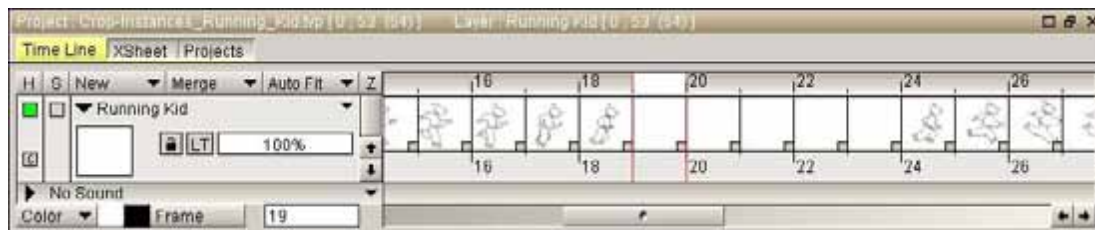


image 18 duplicated



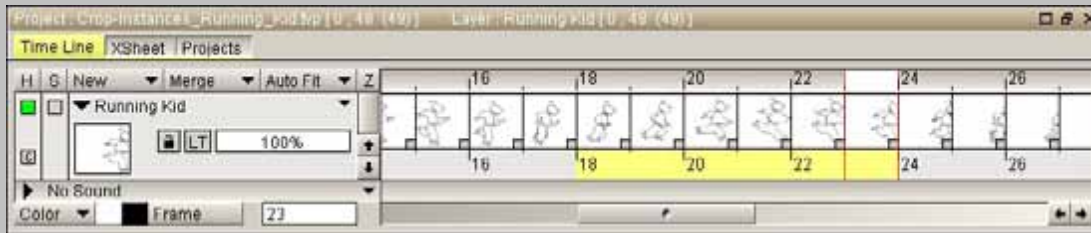
images inserted from image 18



The *Insert*, *Duplicate*, *Delete images* options are also available in the *Image* main menu.



It is possible to select several consecutive images of a layer with a simple click and slide of the left mouse button under the timeline icons. The images selected are then marked in yellow (see below).



It is therefore possible to duplicate or delete all images selected in the same way as described above.

Cut, Copy, Paste images

When using the method described above, it is also possible to cut, copy and paste your images anywhere you wish.

This may be in the same layer, from one layer to another, or even from one project to another if you are working on several projects.

Once you have created a selection within the layer of your choice, the contextual menu displayed with a right click on the timeline allows you to cut or copy the images selected.

Finally, to paste your images, you must:

- select a current image which will be directly in front of the images you wish to paste in.
- select *Paste images* in the contextual menu of the timeline.



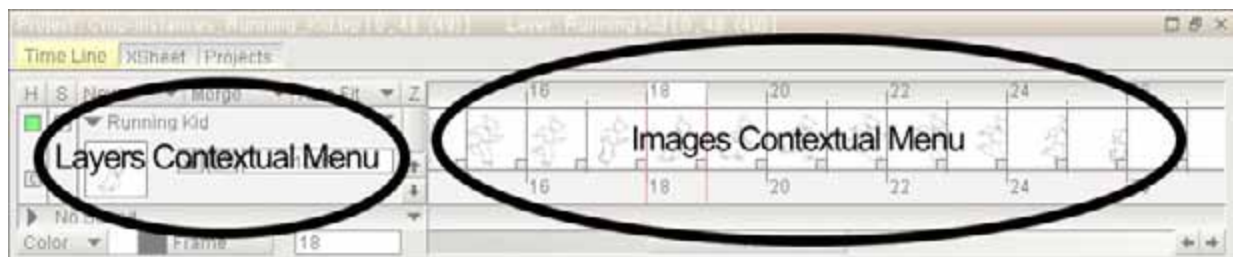
The *Cut, Copy, Paste* options are also available in the *Image* main menu.

Cut, Copy, Paste layers

The method employed to cut, copy and paste an image or animation layer from one project to another is the same as that used for images.

To select several layers, simply left click on these layers while pressing the [Ctrl] or [Shift] keys as explained in lesson 3. The layers selected then appear in yellow.

The layer's contextual menu is located in the left section of the timeline, the image's contextual menu is on the right side of the timeline (see below).



The *Cut, Copy, Paste layers* options are also available in the *Layers* main menu.



Before transferring the layers from one project to another, always ensure the resolution is correct, otherwise your images may be distorted.

Working with instances : (new !)

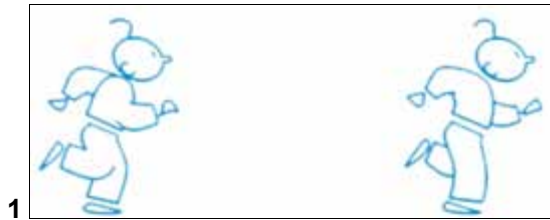


In this chapter :

- * The blue images are the new ones.
- * The grey images are those which have been drawn in one of the previous steps.
- * The green images are here to show the global render of the animation, once it is finished.

Introduction

In traditional paper animation, the animators are often using the following method :



1

* Firstly the key images are drawn. The purpose is to get a handle on the global movement, on the required number of images, on the timing to schedule, etc ...

In the example opposite, the kid is running from the left to the right of the screen. Two key images are drawn.



2

* The second step is to locate and draw the most important frames. In our example, this is when the kid is jumping (the two feet are not on the floor).

* Finally, the inbetween pictures are added :

To begin, an image is drawn between each picture already visible on the timeline.



3

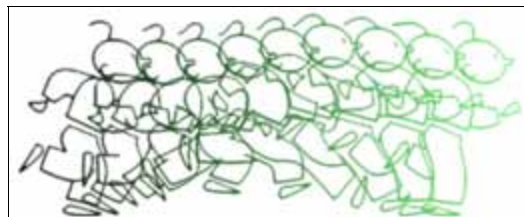
After this, new inbetweens are added among the previous one. this usually helps a lot to obtain a good quality of animation (in other words a smooth flow of movement)

* The subdivisions are repeated until the animator is satisfied of the rendering.



4

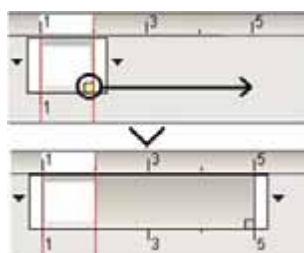
=



final

This simple process needs some successive subdivisions along the animation layer of the timeline. That's not always easy because the images duplication, creation or copy are not always convenient to use. Adjusting the timing of the whole animation usually needs to duplicate and/or delete some frames and can be time consuming. That is the reason why the use of the images instances is clearly advised.

What is an Instance ?



An instance is simply an image in an animation layer, an image which duration can be adjusted. It is the new animator dedicated tool.

Each icon (or cell) of the timeline has now a small colored square which allows to use this feature.

To do so, simply click on this little handle (it becomes yellow) and move it as shown opposite.

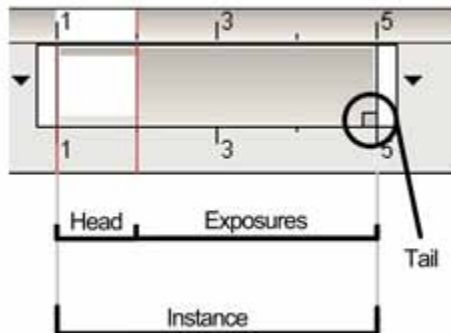
You have just increased the duration of the current image.

Any image of an animation layer can be considered as an instance.

The use of the instances allows to save a lot of time when following the previous steps. It also allows to manage more easily the timing.

Some vocabulary

Here is the name of each new element visible on screen :



Opposite, we have an *Instance* containing four *Cells*. The first cell is called *Head Cell* or more simply : *Head*.

The following cells (when existing) are called *Exposures cells* or *Exposures*.

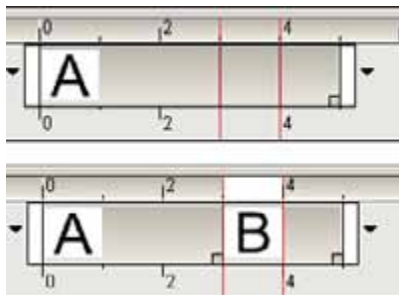
The *tail* of our instance is the little handle ending the *Instance* which you can drag to adjust the number of *Exposure Cells*.

The content of the cells

Whatever the size of the instance could be, the exposure cells are an accurate reproduction of the head cell. At the first sight, all the cells of the instance have then the same content.

You should however take into account that all the cells of an instance does not have the same function : Indeed, if a modification of the head cell has a repercussion on the exposure cells, it's clearly not the same if you decide to modify an exposure cell directly.

Splitting an Instance into two smaller Instances



Once an exposure cell is modified, the current instance is broken into two smaller instances.

For example (opposite), our instance contain the letter "A".

Modifying the third exposure cell by deleting the letter "A" and

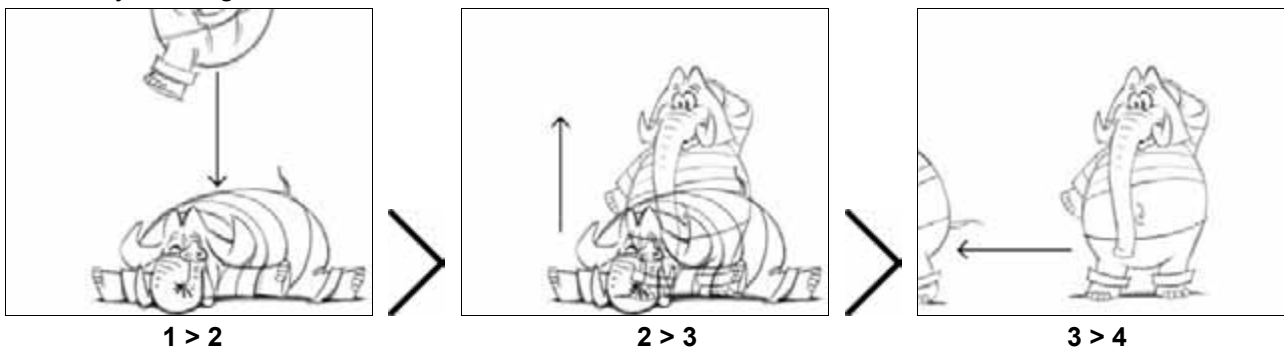
drawing the letter "B" will create two different instances, the first one containing the letter "A", the second containing the letter "B".

We will then see the following images when playing the sequence: A A A B B.

How to use the Instances for animating

Now, let's study a new example :

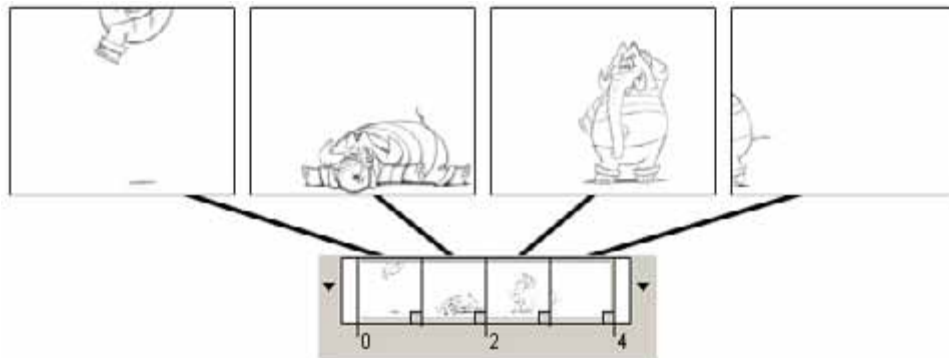
In our animation, the elephant falls from the top of the screen, then gets up, and finally leaves the screen by walking on the left direction.



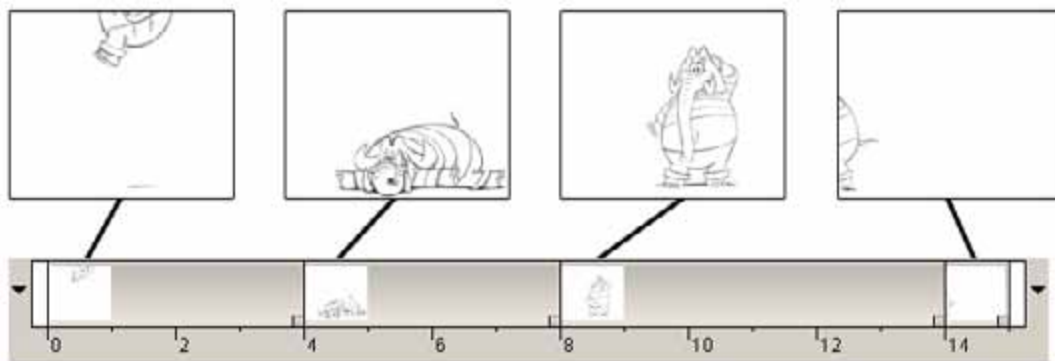
We can already and easily distinguish four key images from which the inbetweens will be drawn. Let's re-use the method introduced earlier in this lesson, but with image instances :

- * Firstly create a new animation layer and duplicate the current frame three time. You must have four empty instances on the timeline.

- * We need then to draw the four key images in each instance.

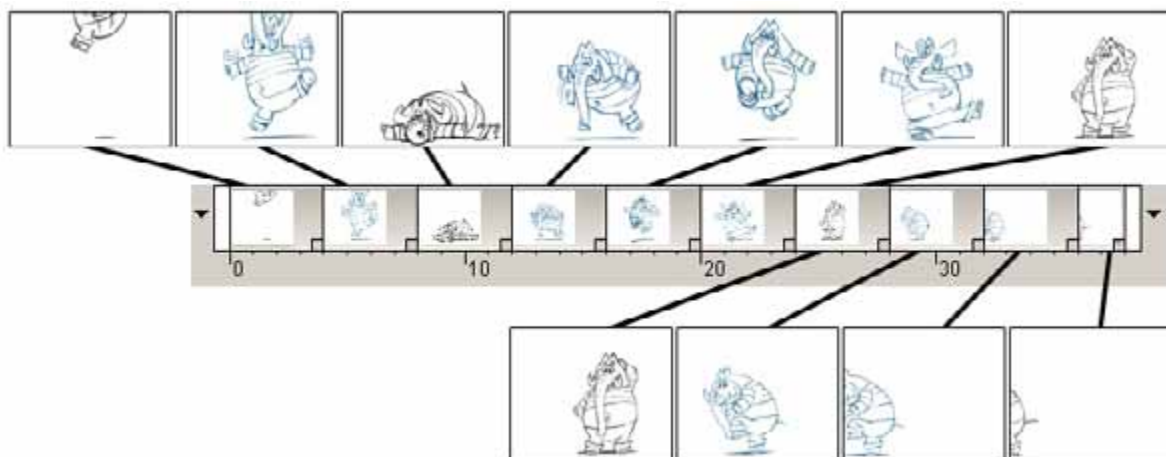


- * Just after this operation, you can adjust the timing by choosing the appropriate number of exposure cells in each instance.



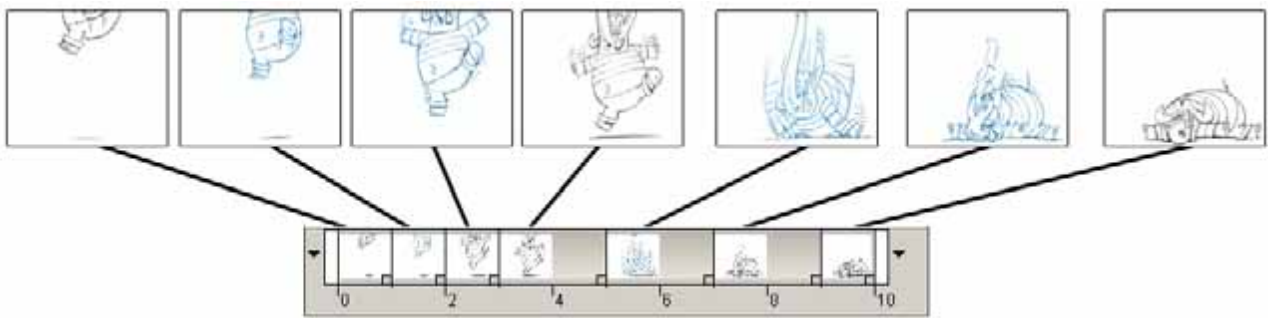
If you need a quick preview of the animation when drawing, it is advised to use the *FLip-Book* option. (see lesson 4 for more details)

- * Once this task is finished, we can break the four existing instances in order to draw the first inbetweens. (the inbetweens are drawn in blue for more readability)



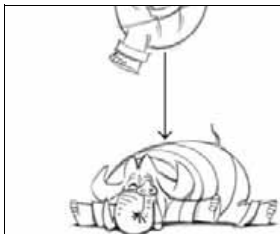
You can use the *Lighttable* option to help you during the drawing process. It will take only the head cells into account. (please read the lighttable section further in this lesson)

* Now we can break, move and resize again the existing instances in order to draw the second series of inbetweens. Below, you will find the beginning of the resulting timeline.



At any moment of this process, you can, by only few mouse clicks, change the number of cells of your instances, and then improve the whole timing of the animation.

* Continue the process by breaking again the existing instances and by adding inbetweens. Stop it once you are satisfied with your animation.



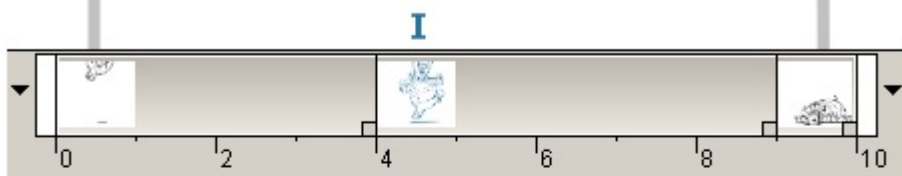
1 > 2

To finish, here is a quick overview of the steps which were needed to create the animation from the first to the second key image :

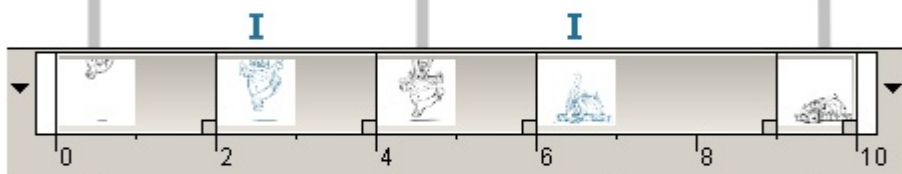
The blue « I » below shows where the last instance was broken (ie : splitted) into two instances.



Here are the two key images, at the extremities of the animation



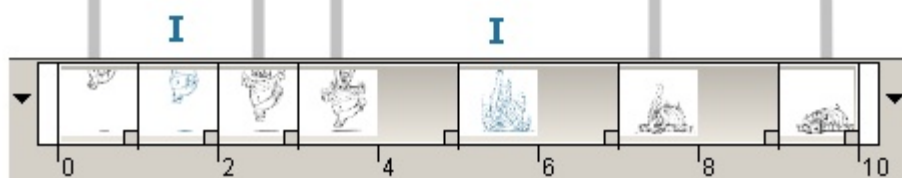
A first instance is created in the middle of the layer.



Two new instances are created for the inbetweens.



The instances are moved and resized.



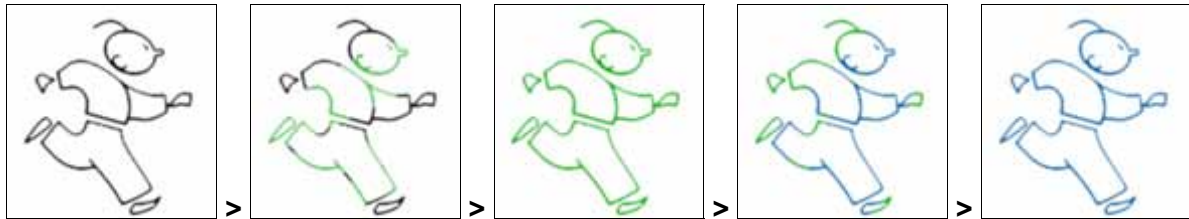
Two last instances are created for the last inbetweens.

How to change the colors of a rough



You can use the option opposite of the tool bar in order to draw only on the opaque or semi-transparent pixels of the screen.

It allows, for example, to change the colors of your drawings.



How to transform an *Image layer* into an *Animation Layer*



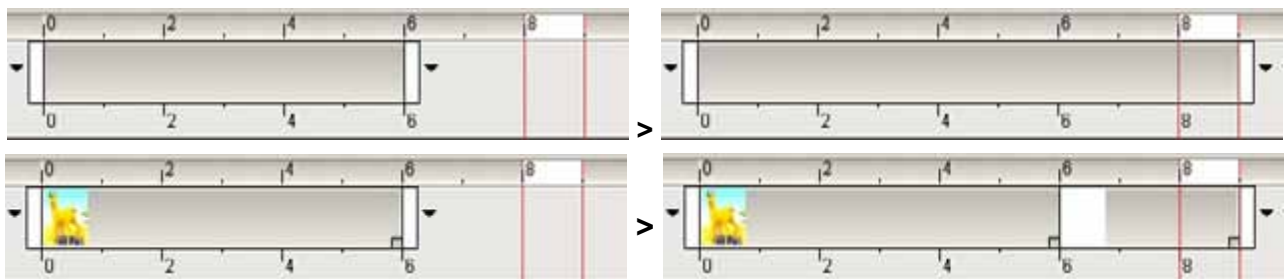
If you need to transform an Image layer into an Animation layer, you can use the *Transform into Animation layer option* of the layer main menu. (it is also located in the contextual menu of the image layer)

Note that an image layer with several images will be transformed into one instance with several exposure cells.


Drawing outside the existing layers




Once you try to draw outside a layer in the timeline, TVPaint Animation Pro will ask you if you want to stretch the current layer, in order to make it reach your position. If you are using an image layer, the number of images of the layer will be increased. If you are using an animation layer, a new empty instance will be created.




Erasing the content of an image instance

Using the erase button  of the main panel on the head cell of an instance makes its content deleted.



Using the erase button  of the main panel on an exposure cell of an instance always breaks the instance into two smaller instances.



Using the erase button  of the main panel on several cells and/or instances turns each cell into an empty single instance.



Remove cells from an instance

Once several images from a layer have been selected (see lesson 4, if necessary), it's possible to delete them. To do so, just select the *delete* option in the contextual menu of the layer or the appropriated button in the animator panel. (see below)



Deleting the exposure cells of an instance will make all the images of the layer move to the left. The head of your instance stay the same.



Deleting the head cell of the first instance of the current layer will make the images of the layer move to the left and will also delete the content of the instance.



Deleting the head cell of an instance in the middle of the layer will make its exposure cells be linked to the previous instance.

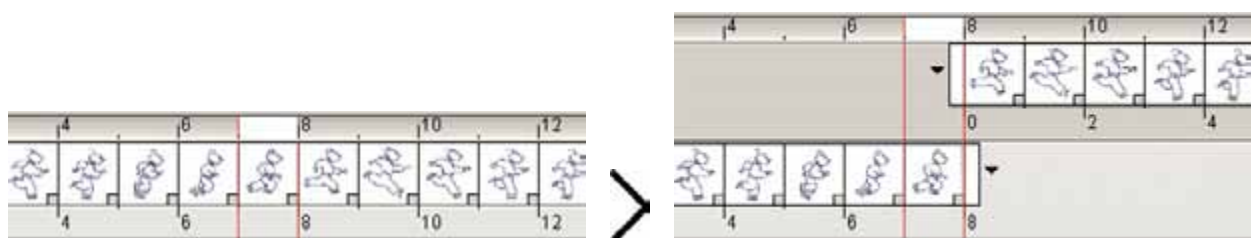


Split a layer

It is possible to subdivide an image or animation layer into two separated layers.

To split a layer in two parts, you first need to go on to the image in front of the point at which you wish to place the split.

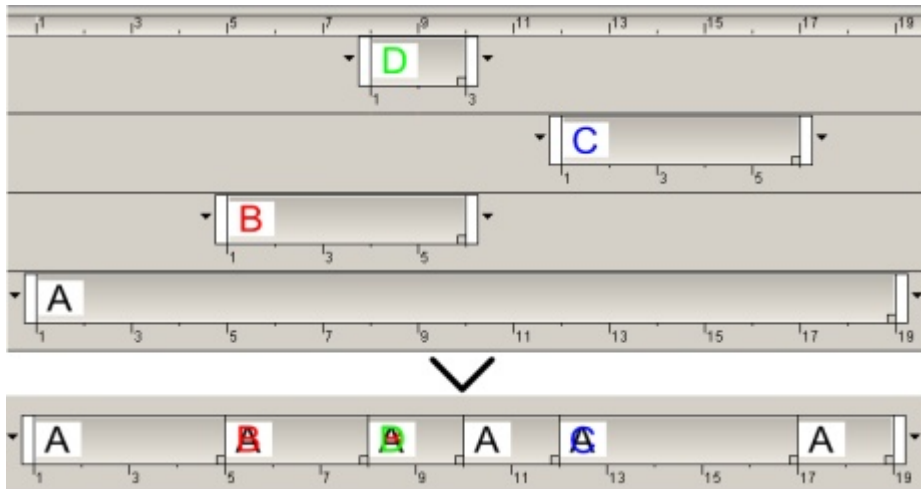
Then select *Split layer* in the layer's contextual menu to obtain the result shown below :



Merging layers

We already saw in lesson 3 how to merge the image layers. It is not really different if you decide to merge animation layers with instances. You can use the *merge* menu of the timeline or drag'n drop a layer on another layer.

TVPaint Animation Pro will always try to create instances in the merged layer.

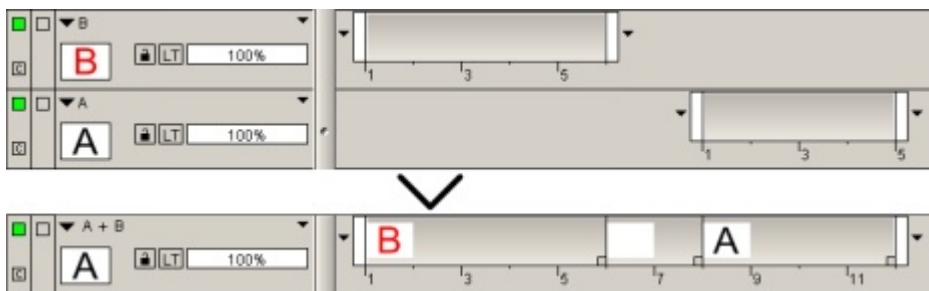


Opposite, four layers :
A, B, C and D are going
to be merged.

(we used the option
Merge all Layers)

The resulting layer at
bottom use the
instances system.

Please note that if you merge an image layer containing more than one image, it will be transformed into an Instance with the adequate number of cells. See below :



Opposite, two image
layers : A and B are
going to be merged.
In the resulting layer, at
bottom (we called it
« A+B »), the A and B
layers are replaced by
two instances.

The empty space between the two original layers is replaced by an empty instance.

Stretch a layer

We have described how to increase the number of images of a layer by inserting some new exposure cells in the instances. There are, however, other methods to increase the number of images in a layer.



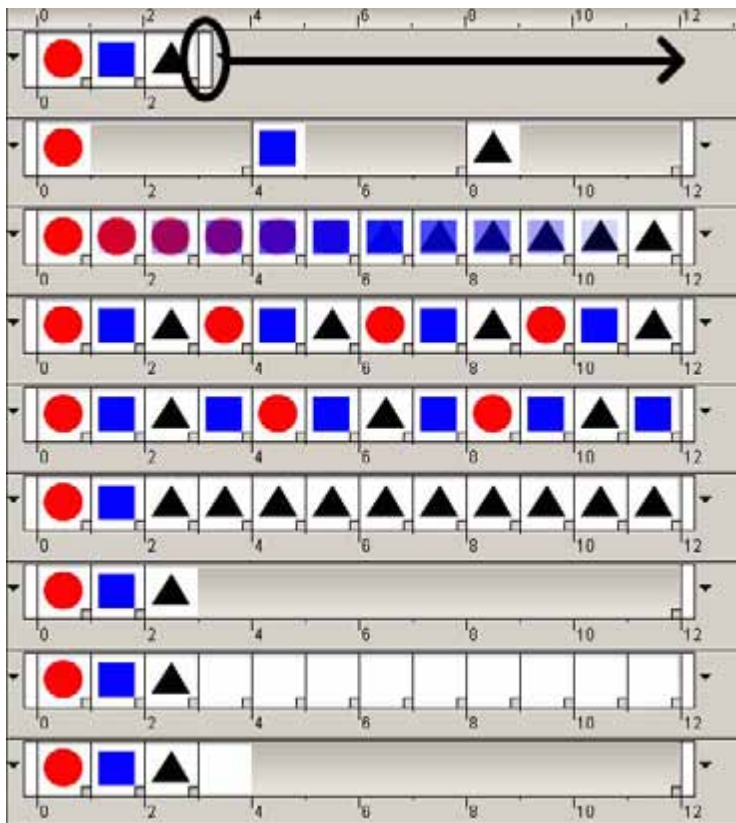
Click and slide to the right on the tab encircled in black (see next page) to call up the panel shown opposite.

The example below gives you an idea of the effects produced by the various options.

Interpolation is nothing but a fade effect calculated and applied by TVPaint Animation Pro to fill the intermediary images which will be inserted between the original images.



It is possible to stretch a layer to the left by repeating the operation described above with the left tab.



Original layer to be stretched to the right.

Stretch without interpolation.

Stretch with interpolation.

Repeat: Loop.

Repeat: Ping-Pong.

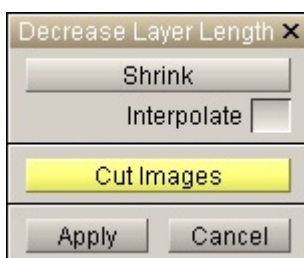
Repeat : Hold.

Repeat : Exposure.

Add empty Images.

Add empty Exposures.

Shrink an Animation layer



It is also possible to reduce the number of images in a layer using an analog method.

Click and slide to the left on the encircled tab below to call up the panel shown opposite.

The example below gives you an idea of the effects produced by the various options.



The original layer which will be contracted in time.

Move the tab to the left.

Option *Shrink* without interpolation.

Option *Shrink* with interpolation.

Option *Cut images*.

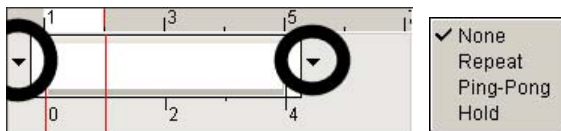
With interpolation, the numbers « 1,2,3 » are mixed in the same image, the numbers « 4,5,6 » in the next, then « 7,8,9 » etc ...

Without interpolation, the intermediary images between images 1, 4, 7 and 10 are deleted.



It is possible to shrink a layer to the left by repeating the operation described above with the left tab.

Pre- and Post-behavior



Did you notice the small triangles on either side of the layers?

A left click on the triangles offers you access to the options regarding pre- and post-behavior of the layers.

Let's take the case of post-behavior as an example (pre-behavior works in the same way). You may choose between the options: *None*, *Repeat*, *PingPong* (the last option only applies to animation layers), *Hold*.

These options have the same effect as those offered when stretching a layer. However, in the present case, the layer is not stretched and the post-behavior will be taken into account until the end of the animation..



These options are also present in the contextual menu of the layer.

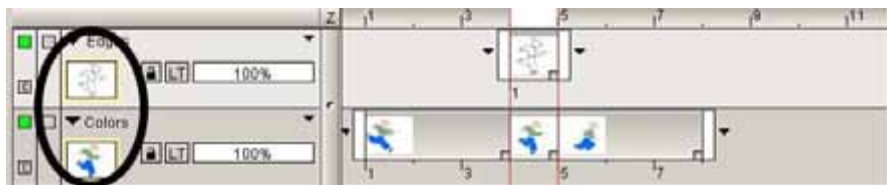
How to use several layers at the same time

If you use instances when working, it could be sometimes helpful to use several layers at the same time (for instance, if you want to stretch a drawing and its colors).



You can select one layer by using the left mouse button on its main thumb. If you want to select more than one layer, you can use the [ctrl] key and select the needed layers by using the same method. Of course, you can also use the layers contextual menu.

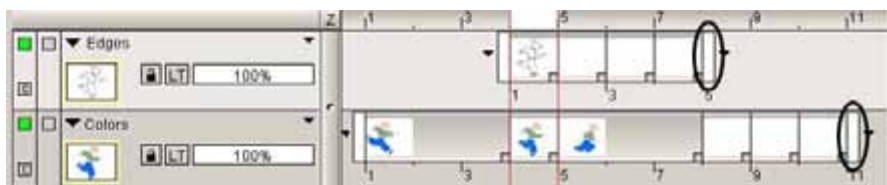
Once a layer is selected, its main thumb is yellow encircled. (see below)



Let's imagine we have selected the two layers opposite. We are currently located on the fourth image of the timeline.



If you stretch the instance on the *Edges* layer by moving its tail, the corresponding instance on the *Colors* layer will be stretched in the same way.



If you stretch the *Edges* layer by moving the right tab, the *Colors* layer will be stretched in the same way. (we chose here to add empty instances)



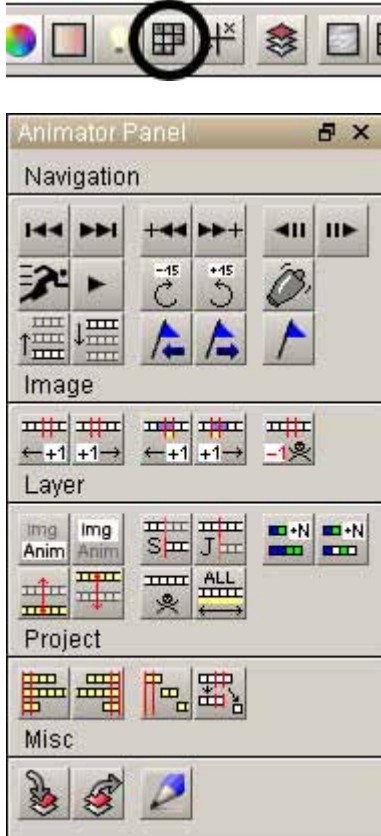
If you click and slide a selected layer on the timeline, the other will follow.

The *Recompute Exposures* option

This option of the *Layer* main menu will try to transform the images of the current layer into heads or exposures cells. This option will only work if there are several identical images in your layer.



The Animator Panel



We have not yet discussed these windows which appear when the program is started. They comprise a wide variety of functions which will help you save a great deal of time when you start to get the hang of using the program. You would have noticed that many of the functions already discussed are present in the *Animator Panel*. It was, however, important for us to start by explaining the fundamentals of the program before introducing you to some shortcuts!

Amongst these, you will find the possibility to add images before or after the current image, split a layer (after the current image), delete an image or layer, convert an image layer into an animation layer and vice versa, define bookmarks (add/delete), etc. Now we are going to take a closer look at these functions...

The first thing you will notice is that the panel is sub-divided into several sections: *Navigation*, *Image*, *Layer*, *Project* and *Misc*.



Everything in relation with the creation or modification of custom panels will be discussed in lesson 18.

The *Navigation* icons



: These two buttons offer direct access to the first and previous frames of the current layer.



: These two buttons allow you to move from key to key (if your project has keys) by passing respectively to the previous or next keys.



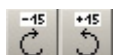
: These buttons are used to move to the last or next frame.



: Run a fast preview of the current animation.



: Play the animation.



: These buttons are workspace rotation shortcuts with respective angles of -15° and $+15^\circ$.



: Layer Shaker.



: Shortcut to select either the layer above the current layer or the one below it.



: Bookmark shortcut buttons used to go to the previous bookmark, next bookmark, or to *Activate/Deactivate a bookmark* in the current image.

The *Image* section



: These buttons are used to create an empty image in the current layer in front of the current image (first button) or after the current image (second button).

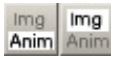


: These shortcuts are used to duplicate the current image by placing a new image before or after the current image.



: Delete the current image.

The *Layer* section



: Buttons used to either convert an image layer to an animation layer, or to convert the current animation layer image into a single image in an image layer (If you select an image sequence, this button will create as many Image layers as the number of selected images).



: The first button is used to split the current layer into 2 separate layers after the current image. Working similarly to the previous button, if you select a sequence, the Split action will create 3 layers : one with the images before the selection, one with the selection and a last one with the images after the selection. The second button, as you may have already guessed, is used to join 2 layers to form a single layer. Ensure you select the layers to be joined correctly.



: These two buttons both open the same window in which you will be asked to enter a number of empty images to be inserted. The first button will increase the size of each instance of the current layer by adding exposure cells. The second button will insert empty instances between each instance of the layer. The number of images or cells inserted depends on the number you enter in this window.

The *Project* section



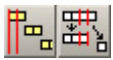
: These buttons are used to move the current layer up or down a notch in the layers window.



: The first button simply deletes the current layer whereas the second automatically selects all frames in the current layer.

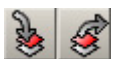


: These shortcuts are used to justify all layers selected either right or left.



: The first button is used to link the previously selected layers. The second button is useful when you wish to split your current project into 2 distinct projects after the current image.

The *Misc* section



: These 2 buttons enable the use of a virtual stack in which you will store the current image with the first button. This image may then be used by simply pressing the second button. Note, on the one hand, that the last image added to the stack is always the first to be removed and, on the other hand, that the number of images stored in this virtual stack depends on the hard drive space available.



: This button opens the *Tool Bin* panel seen in the next lesson.

The classical tools of the animator

Rotate workspace

When working with pencil and paper, you often have to rotate the page in order to touch-up the lines drawn.

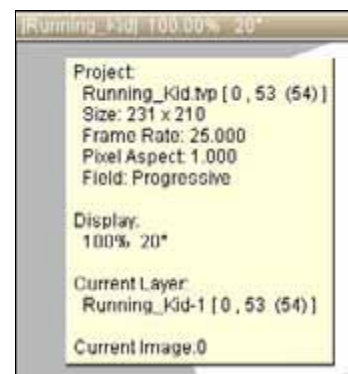
This is also possible with TVPaint Animation Pro thanks to the workspace rotation function.



This is done by left clicking on the button illustrated opposite in the current project window and then moving the mouse.

A right click on this button offers access to predefined workspace rotation values.

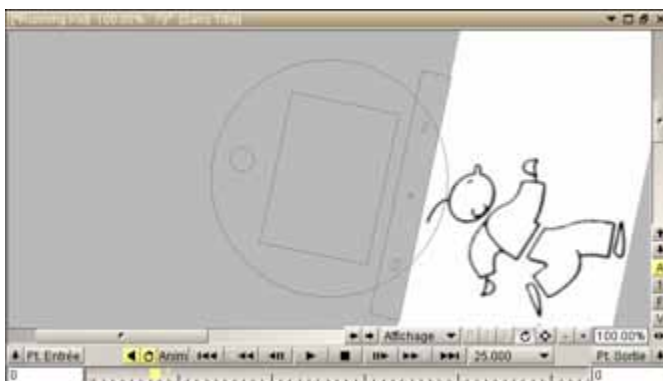
You may also use the keyboard shortcuts [Ctrl+Shift+PageUp/PageDown].



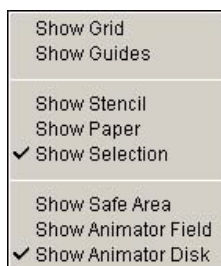
Above to the right you will find all information relative to your project (including the workspace rotation angle) which is accessible by placing the cursor on the project title bar.



It is possible to play your animation with a tilted workspace!

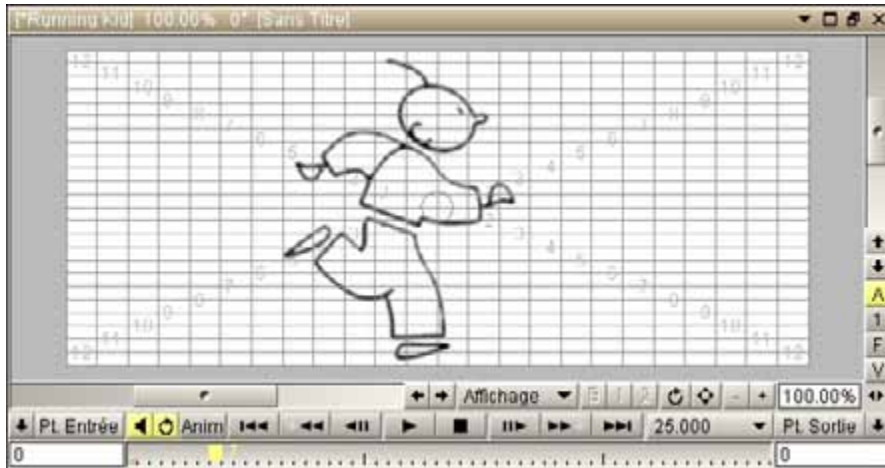


Note that workspace rotation always takes place from the center of your project window. If necessary, you may use the bottom and right-hand sliders of your project window to position the latter (see opposite).



While the workspace is rotated, it becomes visible in the form of an animation disk. If you do not need this function, it may be disabled in the *Display* popup menu of the current project.

Animation artists who prefer to use the *Animator fields* may use the same menu to select this option.



Using the light table

The light table is a familiar tool to cartoon and animation artists. It simplifies drawing of the current image by offering a tone-down view of the images before and after the current image.



It is accessible with a left click on the light bulb icon in the tool bar or via the *Windows* main menu.

This is the way it looks :



- * Load the animation « Running Kid 2 » and display only the current layer.
- * Start by choosing the *color* option in the popup menu on the left-hand side of the *Light table* panel to display all frames behind the current frame in the color indicated (default color red).
- * Then disable all the frames in front of the current frame that you do not want to see by clicking on the corresponding frame number.
- * Go to the frame in the center of the animation.
- * To enable the light table in your layer, click on the *LT* icon in this layer.

The following image will appear in the current project window:



The frames in our animation layer which precede the current frame are displayed on the screen. The frames closest to the current frame « in time » are the most visible and those furthest away « in time » are the most transparent.

The light table is an extremely practical tool as it is also possible to display all frames after the current frame in time and for a given layer.

If you configure your light table as indicated below (choose the *gradient* option in the popup menu on the right-hand side of the *Light Table* panel), the frames after the current frame «in time» are displayed in a colored gradient, with more or less opacity depending on their position in relation to the current frame.



Now that you understand how this tool works, let's go back and take a closer look at its control panel:

- * The two popup menu allows you to display the images after and before the current image with : their original colors, a color or a gradient of your choice.
- * The two colored boxes near those popup menus allow you to select the colors on the screen or a gradient in a preset list to view the frames before and after the current frame.
- * The use of colors in this viewing mode is not mandatory. If you wish to keep the original image colors, select the option *none* (See below).
- * The sliders are used to manage the opacity level of frames displayed (the *Link* button avoids having to move each slider individually by linking them to one another).



- * The numbers are used to select the frames to be displayed.
For example: in the panels shown as an example above, the number 5 to the right of the zero is selected and its slider is set in the center of the scale.
This means that the fifth frame after the current frame will be visible with medium opacity.
- * The *Front* button allows to display the light table images in front of the current image.
- * The buttons *All* and *None* allow to display all the images of the light table or no images.



The number zero enables or disables the light table, its slider manages the global opacity of the table.

If you use instances, only the head cells are taken into account by the lighttable.

The inking process

The floodfill tool



Our running kid is drawn on an animation layer.
We will now fill in the background with the *Floodfill* tool.



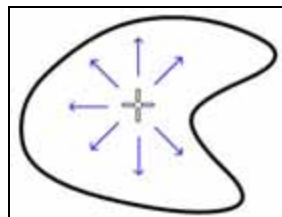
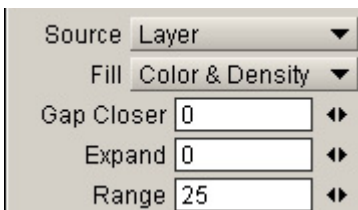
Once the *Floodfill* tool has been selected, various options are proposed in the *Filling shape* panel shown opposite:

- The color modes were discussed in lesson 2,
- The *Smooth*, *Opacity*, *Gradient* and *Opacity mapping* options were discussed in lesson 3.
- The *Wrapping brush* option was studied in lesson 4.

We will therefore only take a closer look at the second section of the *Filling shape* panel.

When using the traditional *Fill* option you choose a pixel in the current project window and then click on it. We refer to this pixel as the *origin pixel*.

The *Fill* option changes the color of neighboring pixels until it is prevented from progressing by the «border» pixels.



Opposite, the «border» pixels in black and the color dispersion from the origin pixel in blue.

The options indicated above allow you to choose the type of pixels to be used as a «barrier» for the *Floodfill* function (i.e. pixels which will not be modified after choosing this option).

Depending on your choice made in the *Fill* popup menu, the pixels considered to be «barrier» pixels will be those with:

- * a different color to the original pixel color
- * a different density
- * a different color and density
- * a different luminosity
- * a color identical to the *B* color.

Depending on your choice in the *Source* popup menu, the pixels considered to be barrier pixels are located:

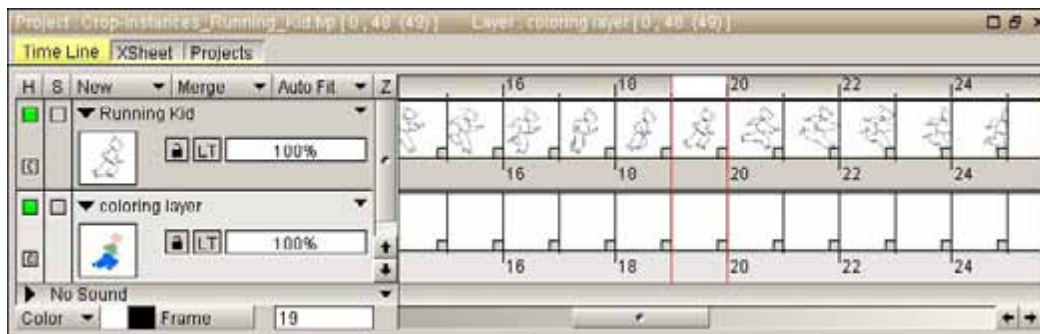
- * on the current layer (by default)
- * on all layers behind the current layer
- * on all layers in front of the current layer

* on all layers displayed on the screen

It is therefore possible to color our running kid on a layer independent of its contours.

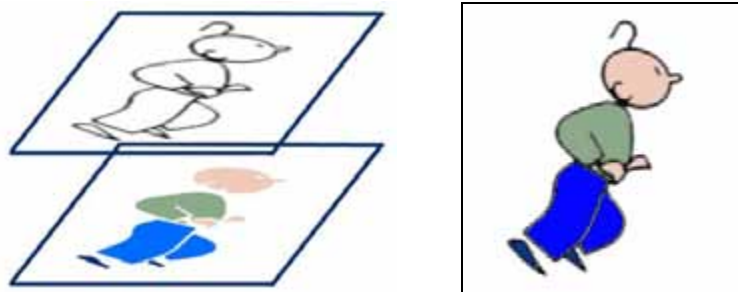
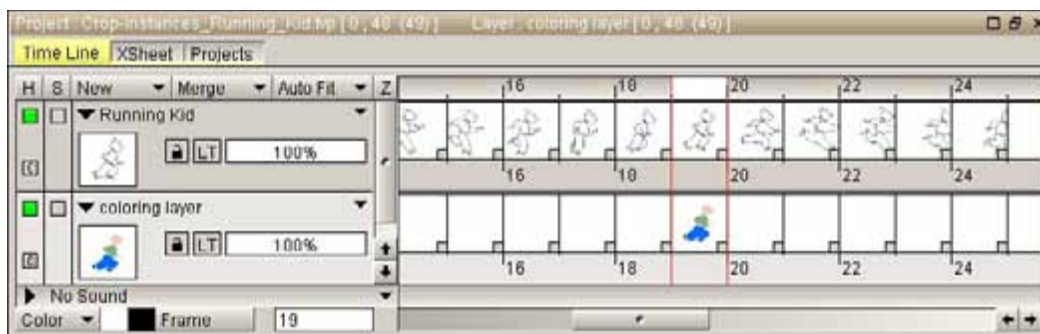
Let's take a look at the timeline below:

(in this case, the white pixels are transparent following a clean up of the animated footage)

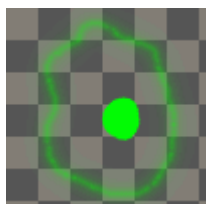


Go to the «coloring layer» located behind the «Running Kid» layer and choose the layer placed in front of the current layer to color the running kid in the «coloring layer» using the outline of the «Running Kid» layer.

It is then possible to obtain the following result:

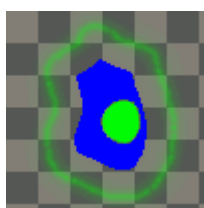


* The *Range* option enables you to numerically adjust the tolerance threshold for the aforementioned criteria (*Fill shape* menu).



For example, opposite, a green shape is drawn with an airbrush on a transparent surface with a checker background. The floodfill option applied in the center of the circle with the color blue provides the image results shown below.

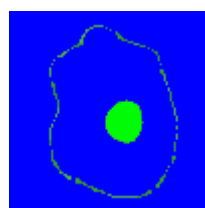
fill = color and opacity, expand = 0 (in all cases below)



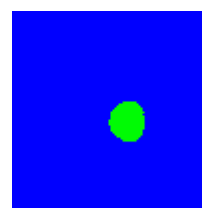
range = 0



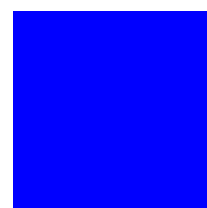
range = 50



range = 100



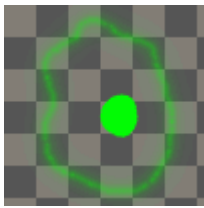
range = 200



range = 255

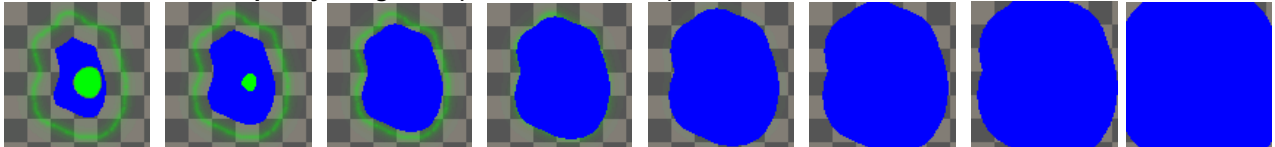
Progressively, it is noted that the tolerance to «border» pixels becomes less and less.

* The *Expand* option increases the size of the floodfill area to the number of pixels of your choice. This enables you to limit the number of border pixels.



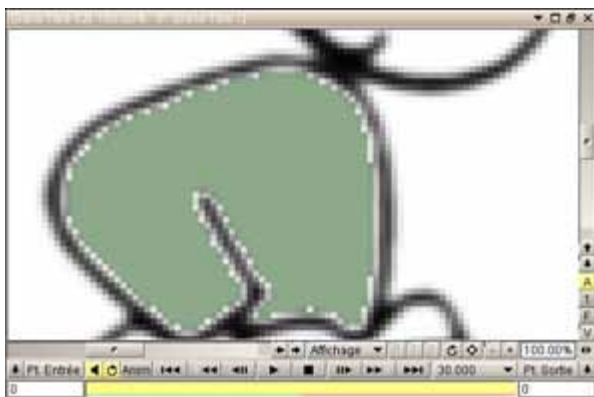
For example: you draw a green line with the airbrush. A left click with the *Floodfill* tool and the color blue and you will obtain the following results:

Floodfill = color and opacity, range = 0 (in all cases below)

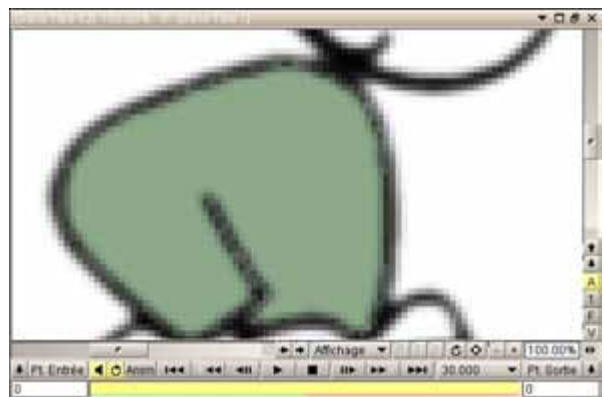


expand = 0 expand = 5 expand = 10 expand = 15 expand = 20 expand = 25 expand = 30 expand = 40

Combine the two options *Expand* and *Range* to avoid the result indicated below left and to obtain the result below right.



>>

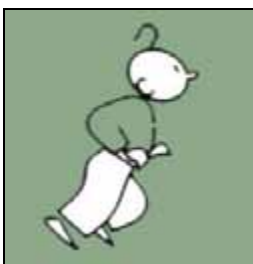
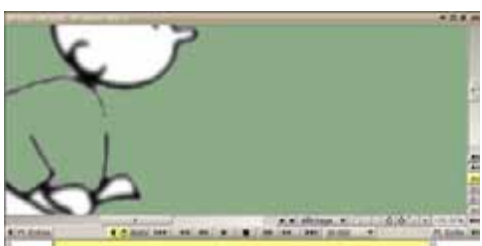


* The *Gap* option allows you to avoid «overspills» when you try to fill a surface which is not completely closed.

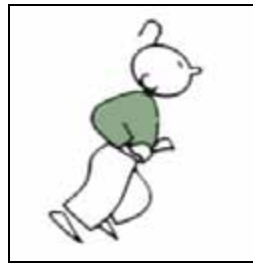
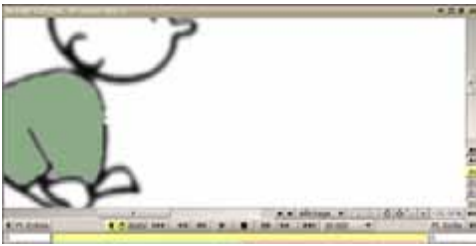
Low values are used in the case of «small gaps», whereas high values are used for larger gaps (it is worth noting that higher values sometimes result in a lower floodfill quality).



Image with «a gap»



Floodfill the character without *Gap* closer



Floodfill the character with *Gap closer*

The Auto Pick Color option

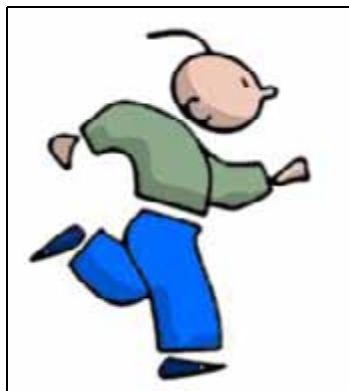
Finally, you have noticed that there is also a box called *Auto pick color*:

This option will save a great deal of time as it allows you, when checked, to pick a color when you click and to place it when you release the button. Combined with a *Light table* which only displays the previous frame, you may pick the color from the previous frame and place it in your current frame.



Create shadows

Once you have finished coloring your running kid, you may add shades to the latter using the toonshading effects discussed in lesson 12.



toonshading



toonshading



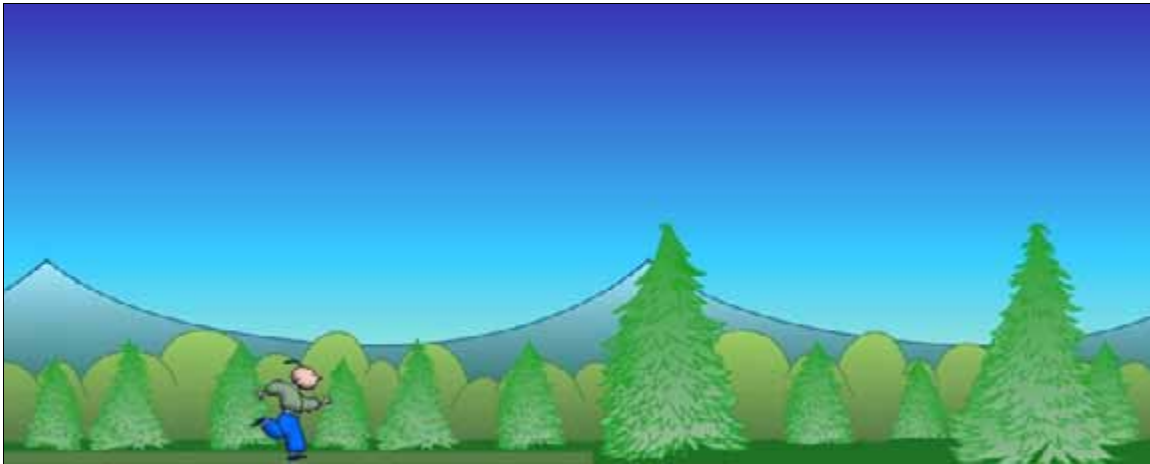
Drop Shadow

To finish the animation

Camera movements

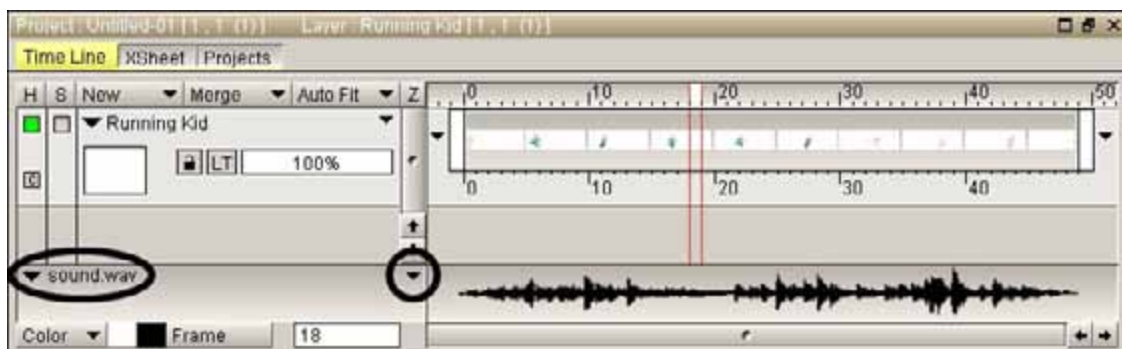
Now that your running kid is animated, it is possible to add a scenery behind him and to add camera movement (see below).

Two effects will help you with this: *Keyframer* and *Multiplane camera* (go to lessons 14 and 15 for details of these effects).



Add music

The graphic design side of your project is now complete. If you wish, you may now add a sound track in order to give it that final touch. (see lesson 8 for more details about this subject)



Lesson 7

Other TVPaint Animation Pro drawing tools

In this lesson, you will:

- Finish studying the drawing modes.
- Use the clipboard.
- Use the spare image.
- Learn how to use animbrushes as drawing tool.
- Use cutouts and selections.

The others drawing modes

We studied in lesson 2 several drawing modes : *color*, *behind*, *erase*, *shade*, *light* and *panto*. We are now going to study the other drawing modes at our disposal. The drawing and the photography below will serve as a basis in this chapter.



The *Saturate* and *Unsaturate* drawing modes

These two modes are used to increase or decrease pixel saturation. A highly saturated color is a very bright color whereas a less saturated color is rather dull and closer to gray. Here, the *Penbrush* tool was used with an opacity and power of 100% for a radius of 30 pixels.



Penbrush tool in *Saturate* mode



Penbrush tool in *Unsaturate* mode

The pixels of the house are gray with a light red hue. The *Saturate* mode will therefore increase their red components and render them more vivid. The *Unsaturate* mode will have little effect on the same pixels as they are already close to gray.

The pixels of the sun and sky are very saturated. The *Saturate* mode will therefore change the yellow hues only a little. The *Unsaturate* mode will modify them according to different shades of gray.



Penbrush tool in *Saturate* mode



Penbrush tool in *Unsaturate* mode

The *Smooth* and *Sharp* drawing modes

The *Smooth* mode attenuates the contours of elements in the image and creates a blurred effect while the *Sharp* mode will accentuate them.



Penbrush tool in *Smooth* mode



Penbrush tool in *Sharp* mode



The *Colorize* and *Tint* drawing modes

These two modes modify the color of the pixels:

- * The *Colorize* mode adds the A color while respecting the pixel luminosity of the source image.
- * The *Tint* mode also adds the A color but respects the saturation as well as the luminosity. The more a pixel is close to a gray, white or black color (with all the shades they contain), the less effect the color change will have.

This is visible in the drawing areas corresponding to the cloud : they are less affected by the *Tint* than by the *Colorize* mode.

Here the A color is red : R=255, G=0, B=0.



Airbrush tool in *Colorize* mode



Airbrush tool in *Tint* mode



The *Negative* and *Solarize* drawing modes

The *Negative* mode inverses the value of the pixels in the source image (the yellow of the sun becomes blue, the black text becomes white, etc.).

The *Solarize* mode gives a slightly different result than the *Negative* mode.

It mixes the negative of the source image with the source image itself and thus imitates the photographic solarization procedure.



Airbrush tool in *Negative* mode



Airbrush tool in *Solarize* mode



The *Grain* and *Noise* drawing modes

The *Grain* mode adds a multi-colored grain to the current image. This creates a texture imitating a light photographic grain.

The *Noise* mode adds a single-colored grain, the color applied is the A color.

The *Grain* and *Noise* modes themselves also depend strongly on the power and opacity of the drawing tool. Here the A color is a gray color.



Penbrush tool in *Grain* mode



Penbrush tool in *Noise* mode



The *Emboss* drawing mode



Airbrush tool in *Emboss* mode

The *Emboss* mode accentuates the image contours by adding a shadow. Once the tool is used on the image, it appears to have more volume.

The *Add* and *Sub* drawing modes

The *Add* mode adds the R,G,B,A values of the current tool with the color A to the R,G,B,A values of the source image pixels. The result is the image shown on the left.

The *Sub* mode subtracts the R,G,B values of the color A from the R,G,B values of the source image pixels. The result is the image shown on the right.

Here the color A is purple: R=128, G=0, B=128.



Airbrush tool in *Add* mode



Airbrush tool in *Sub* mode



These last four modes : *Add*, *Sub*, *Multiply* and *Screen* are more useful when they are used with brushes or with certain effects.

We will come back to them in further lessons.

The *Multiply* and *Screen* drawing modes

The *Multiply* mode multiplies the individual values of the R,G,B channels of the source image pixels with the sum of the R,G,B values of the A color pixels. The *Screen* mode inverses the values previously used.

Here again, the A color is purple: R=128, G=0, B=128.



Airbrush tool in *Multiply* mode



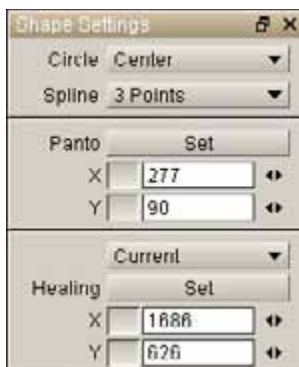
Airbrush tool in *Screen* mode



The *Healing* drawing mode

The *Healing* drawing mode is an image-editing tool. It will certainly interest some users who want to improve their photography.

It works like an enhanced pantograph : it allows to reproduce the texture and the global illumination of a reference area, and preserve the color data.



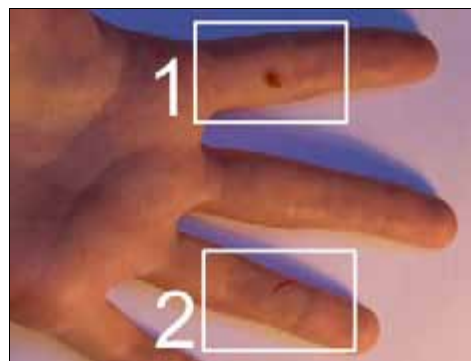
The reference area can be set in the *shape setting* panel (we already talked about it in the lesson 2). It is accessible in the *Windows* main menu or with a right click on one of the seven drawing shapes (dot, freehand, line, spline, rectangle, ellipse and floodfill).

In the examples below, two wounds of a photographed hand have been corrected by using the *Healing* mode with the airbrush tool.

The *pantograph* mode on the right doesn't give good results, with similar settings.



>



Opposite, the source picture and two fingers that will be retouched.



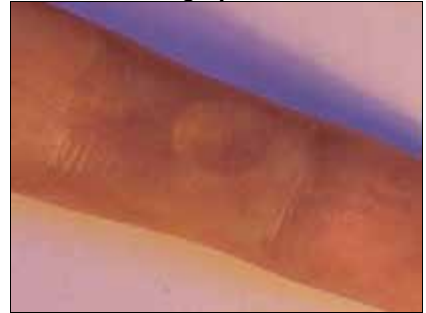
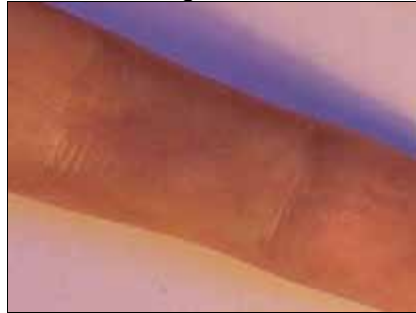
Source picture with the reference area (red cross)



Corrected picture with the *Healing* mode



Corrected picture with the *Pantograph* mode



With a bit of practice, it could be easy for you to remove the dimple of your photographs.



The face with dimples



The same face with the dimples removed

Please note that the reference area can be located on a different picture than the current one. The reference area can be the background, the displayed picture, the current image, the previous image, a paper or an image copied into the spare.

It is therefore possible to fake your photographs : here below, some scars have been added to the skin by using this fissured wall picture as reference layer.



The same face with scars added



The reference picture for the *Healing* tool

Clipboard and spare

The clipboard



The clipboard menu is located in the *Edit* main menu and comprises four useful options which, in a way, serve as an interface between TVPaint Animation Pro and your other software packages.

* The *Copy brush to clipboard* option makes the current brush available for other software packages installed on your computer.

* The *Copy image to clipboard* option makes the current image displayed in your project (including the background) available for other software packages installed on your computer.



Wordprocessors, spreadsheets and digital creation software packages generally use a function referred to as *Paste buffer content* or *Paste* which you simply have to call in order to use your brush or image.

When you use the [print screen] key on your keyboard or when you use the *Copy* option (to be understood «copy to buffer») in the program, it is possible to recover the image stored in TVPaint Animation Pro :

* The *Get brush from clipboard* option makes the current image stored in the buffer memory of your computer available as current brush.

* The *New layer from clipboard* option creates a new image layer from the clipboard.



For the latter option, ensure the size of your current project is adapted to that of the image stored in the buffer memory, otherwise the image may be cropped.

The Spare image

It is possible to virtually store an image of the current layer displayed on the screen in order to use it at a later time (mixing options) or to use specific drawing modes (*Merge* or *Impressionist* modes). This image is referred to as *spare image*.

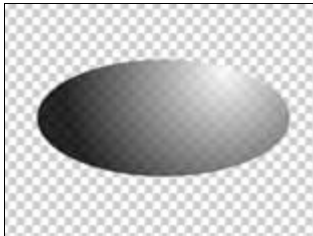


The following examples will provide a better understanding of this notion.

Above you will find the options available in the *Edit > Spare* main menu.




Spare



Current image

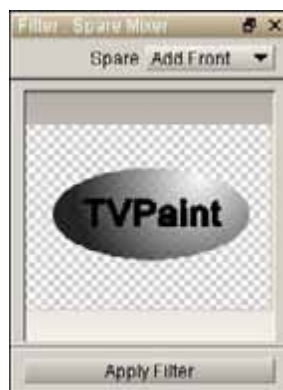
Save the TVPaint logo opposite as a spare image (main menu *Edit > Spare > Copy to spare* or shortcut [Shift+J])

Delete it from the current layer (standard delete tool: ) , then draw an ellipse with an opacity of 75% in its place.

* The option *Swap spare* (shortcut [J]) returns the TVPaint logo to the screen and replaces the spare image with the ellipse.

Using this function again will redefine the TVPaint logo as spare and will display the ellipse in the center of the window.

* Depending on your selections in the popup menu, the *Spare mixer* option offers the following results:



* Finally, the option *Delete spare* is used to delete the spare image.



If you are working with several projects at the same time, note that each project has its own spare image.



When you save a project, the spare page is also saved with this project.

The *Merge* drawing mode



The *Merge* drawing mode is only available once a spare image has been defined. It may only be used with the airbrush, penbrush, mechanical pencil, pencil and wetbrush tools.

It is used to draw the portion of the spare image corresponding to the area traveled by your stylus on the screen.

The *Impressionist* drawing mode

This drawing mode will be discussed in the *Special brushes* section of this lesson. It also requires the use of a spare image.

To perfectly master the drawing tools.

The two tools indicated below are very useful to warp the images and give the appearance that they were hand-drawn.

The *Warpbrush*

The *Warpbrush* may be used to give the impression that a drop of water has fallen on the image. Combined with certain types of paper, it gives the impression that you are looking at the image through a window. There are two types of warps: warp out and warp in (see below).



Warp in at top
Warp out at bottom



Original image



Use of this tool on an image

The *Special brush*

The special brush functions differently according to the drawing mode selected. It shifts the image pixels:

- * uniformly in *Shift* mode,
- * degressively in *Smear* mode,
- * by adding color in *Mix* mode ,
- * by taking into account the spare image pixels in *Impressionist* mode.

Below you will see the results of the first three modes from top to bottom.



In each case, a line was drawn from left to right.

* *Mix* mode (the A color is red)

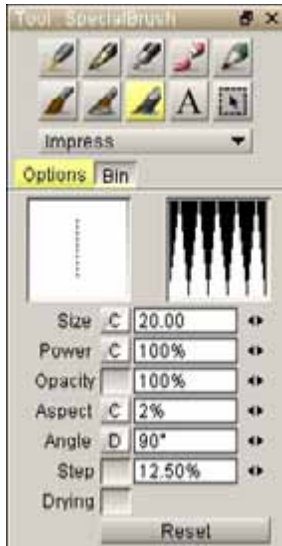
* *Shift* mode

* *Smear* mode

As indicated above, the *Impressionist* mode requires a spare image in order to work. When drawing a line in this drawing mode, the current image is deleted in order to make place for a spare image and the latter is smeared in the direction of the line traced.

This creates quite an eye-catching effect when working with a small tool and with « dotted » *Profiles* and a *Ratio* close to 0% (see *Special brush* panel below).

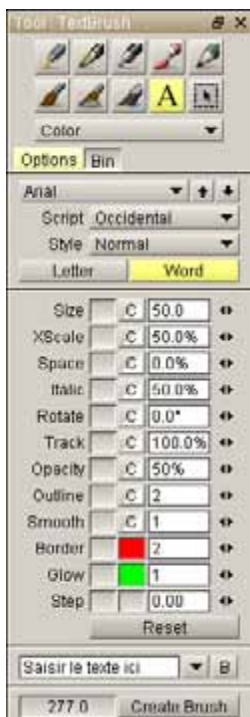
When required, the current image used as spare image may also provide a very original artistic effect.



Opposite an illustration in impressionist mode with parameters panel together with the current image = Spare image.

The *Text* tool

The *Text* tool is used, as its name implies, to generate text brushes.



Size
XScale
Space
Italic
Rotate

Track
Opacity
Outline
Smooth
Border
Glow

Size

XScale

S p a c e

Italic

Rotate

T r a c k

Opacity

Outline

Smooth

Border

Glow

Space

Rotate

Track

Difference

Space (25%): D i f f e r e n c e



Track (125%): Difference

Here you will find a general introduction into how to add a text to your images:

- * Enter the text of your choice in the text field at the bottom of the panel.
- * Select the font of your choice.

- * Select *Letter* mode or *Word* mode depending upon whether you wish to display the entire content of the text field or simply one letter at a time.
 - * Modify the parameters as you require.
- All changes to the numeric fields or using the mini-sliders will be taken into account and displayed interactively on the screen for several seconds in order to allow you to view the result of changes and settings made.
- * Now all that is left is to apply the text to the layer in the location of your choice.

Below you will find a detailed description of the parameters at your disposal for this tool:

- * The first popup menu is used to select the font best suited to your project amongst those installed on your operating system. The two arrows   are used to quickly scroll through the list of fonts available.
- * The popup menus *Script* and *Style* are used to select the character type to be used (occidental, oriental, Greek, etc.) and their style (bold, italic, underlined ...).



The fonts used by TVPaint Animation Pro are of the « .ttf » (True Type Font) format for PC.

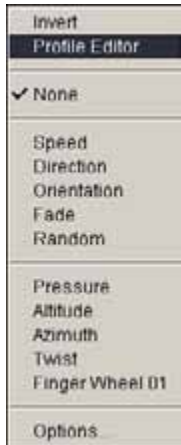
- * The *Size* variable defines the font size in pixels.
 - * The *XScale* variable manages the font width.
 - * The *Space* variable defines the space between characters (a negative value overlaps the characters).
 - * The *Italic* variable modifies the inclination applied to characters.
 - * The *Rotate* variable is used to increase or decrease the angle formed between the text and the horizontal axis.
 - * The *Track* variable adapts the space between characters, but this time, in proportion to the size of each letter in the text field.
 - * The *Opacity* variable defines the text transparency.
 - * The *Outline* variable creates an outline of varying thickness around the letters, but renders the interior of the letters transparent.
 - * The *Smooth* variable applies a blur to the letters.
 - * The *Border* variable creates an outline of varying thickness around the letters.
 - * The *Glow* variable creates a luminous halo around the letters.
- The border and glow may be of any color of your choice.
- * If the *Letter* button is selected, an *Anim.* (Animation) popup menu is present: you may then choose to apply the letters in the text field once only, in a loop, randomly or in ping-pong.
 - * If the *Word* button is selected, a *Step* variable is present: this variable functions in the same way as for standard drawing tools (see lesson 2).

- * The *Reset* button resets all settings.
- * The « ▼ » button provides access to the last phrases or words entered in the text field.
- * The *B* button opens a larger text field in order to work with longer texts.
- * The number in the bottom left hand corner of the panel represents the text width in number of pixels (a width which is dependent on your settings).
- * The *Create brush* button allows you to transform your text into a custom brush and switch to the brush settings in the tool panel.



In addition to the settings via the mini-sliders, do not forget to tick the boxes to take these variables into account.

The connections



Throughout this lesson, we have modified the size, power, opacity, etc. of our tools and you have certainly noticed the letters located in a box left of the corresponding numeric value.

These are the *Connection parameters*. The corresponding contextual menu is accessible by clicking on the box.

Most graphic tablets available on the market are sensitive to pressure, stylus travel speed and inclination, etc ...

TVPaint Animation Pro takes all these advantages into account and it is therefore possible to imitate the specific aspects of drawing by hand.

Here are some examples:

- * If you connect the *Size* of the pen tool with the stylus *Travel Speed*, the thickness of the line drawn will be thicker the faster you move your stylus (to do this, select *Speed* in the *Size* connection menu).
- * If you connect the stylus *Pressure* to the airbrush tool *Power*, the more you push down on the tablet with the stylus, the brighter the color will be on the screen.
- * If you connect the *Opacity* of the wetbrush tool to the *Altitude* of the *stylus*, inclining the stylus will render the aquarelle almost transparent.

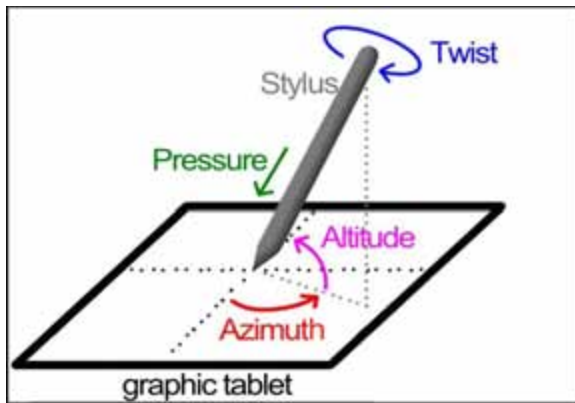
A wide variety of setting combinations are available. Below we will describe each of them. It is then up to you to make the connections according to your needs and creative spirit, don't hesitate to experiment!

The first set of connections applies to pointing peripherals (mouse, trackball, stylus) :

- * *None*: no connections.
- * *profile Editor*: it will be explained in the next chapter.
- * *Invert*: invert the effect of the connection chosen.
- * *Speed*: the parameter connected to the *Speed* will change at a speed proportional to the stylus travel speed.
- * *Direction*: the parameter connected to the *Direction* will change according to the direction of the stylus.
- * *Orientation*: the parameter connected to the *Orientation* will change according to the stylus orientation.
- * *Fade*: the parameter connected to *Fade* will decrease its values as the line drawn progresses.
- * *Random*: the parameter connected to *Random* will vary randomly.

The second set of connections applies only to stylus and graphic tablets:

- * *Pressure*: the parameter connected to *Pressure* of the parameter connected will vary proportionally to the pressure applied to the stylus on the tablet.
- * *Altitude*: the parameter connected to *Altitude* will vary proportionally to the angle formed by the stylus inclination on the tablet.
- * *Azimuth*: the parameter connected to *Azimuth* will vary proportionally to the angle formed between the stylus projection on the tablet and the vertical plane.
- * *Rotation*: the parameter connected to *Rotation* will vary when you roll the stylus between your fingers. (you need a 6D Art pen from Wacom to use this connection)
- * *FingerWheel*: the parameter connected to *FingerWheel* will vary according to these options when using the Wacom airbrush fingerwheels.



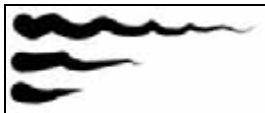
Opposite you will find a summary diagram of the connections indicated above. Note that some tablets do not offer all these options. For optimum results, TVPaint recommends the use of Wacom Intuos 3 tablets !



The speed, fade, orientation and direction connections are adjustable.

Orientation angle, direction angle, speed curve and fade speed may be modified in the *Connection Settings* window (select *Option* in the connections contextual menu shown on the previous page).

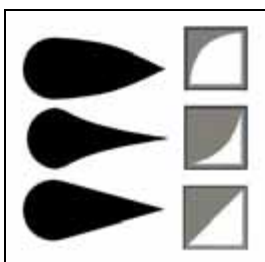
Below you will find some examples to illustrate the effects:



Size connected to *Fade* for various fade values.



Size connected to *Orientation* (right drawing).
Size connected to *Direction* (left drawing).

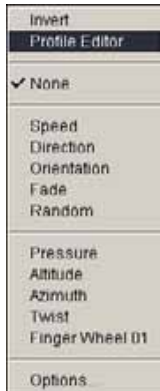


Size connected to *Speed* using various curves.
All three lines were obtained by increasing the stylus travel speed (i.e. with progressive acceleration).



The *Text* tool with *Rotation* connected to the stylus *Direction*.

The connections Profiles



A *Profile Editor* option is also available in the connection menu. Once selected, it opens a new window with a profile curve.

This profile curve allows to adjust the interaction between the parameters (size, power, opacity, ...) and the connection you have just chosen (fade, pressure, random, ...)

A lot of profile curves are then available. For instance, the airbrush tool has 4 parameters which can use up to 10 connections. There are then $4 \times 10 = 40$ potential profile curves.

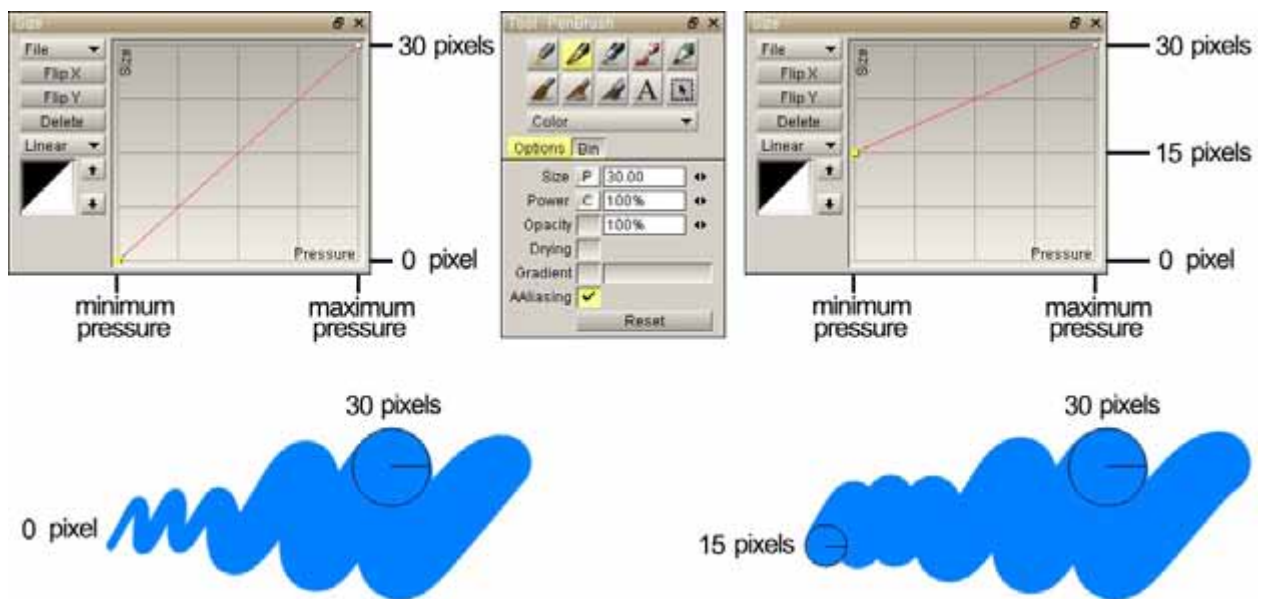
The applications of the profile curves are numerous, and we will only study here the most important examples.

• Size and Pressure

If you connect the stylus *Pressure* to the *Power* of the *Pencil* tool, the more you push down on the tablet with the stylus, the thicker your line will be.

In the example below on the left, the size of your tool will be bounded between 0 pixels and 30 pixels. (In this example, we want to focus on the size parameter behavior, so we will choose *connection = none* for the power parameter.)

Now if we change the profile curve as shown below on the right, the minimal size value for your tool will be 15 pixels.



• Size and Fade

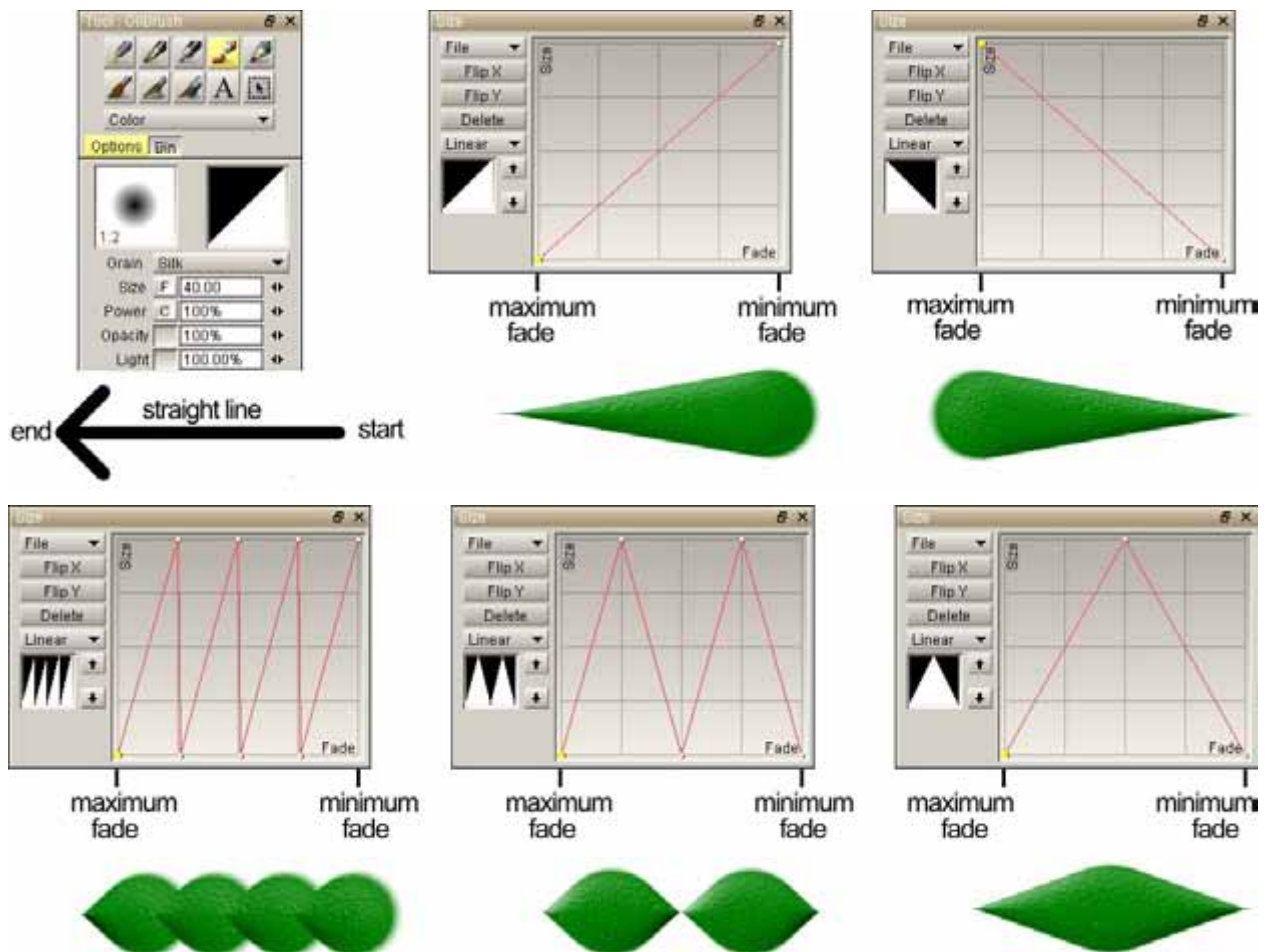
Let's admit that we draw a straight line on the current picture, from right to left with the oilbrush tool. If the profile curve stays unchanged, the line thickness is smaller and smaller.

In our example :

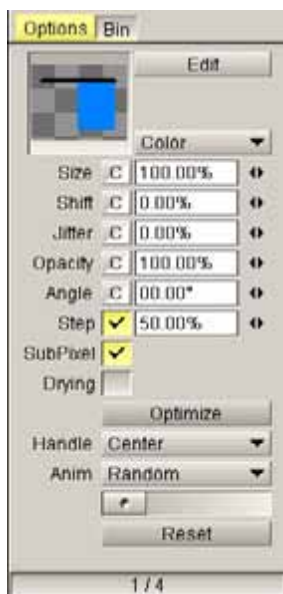
The horizontal axis of the *Connection profile* panel shows the chosen connection from the maximal value to the minimal value.

The vertical axis of the *Connection profile* panel shows the values of the Size parameter.

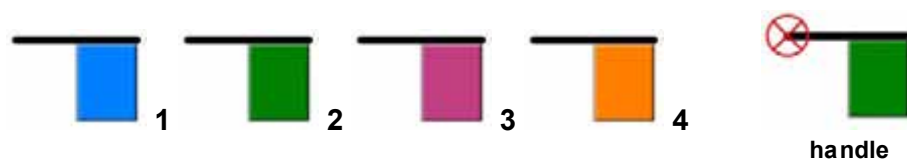
As a consequence, if we change the profile curve as shown below, you will obtain the following results :



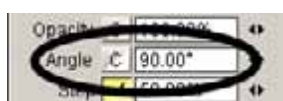
• Angle and Random



Let's admit that you are using an animbrush with four images in order to add some colored flags on a picture. (see below, the handle of the animbrush is on the red cross or red line and the anim behavior is set to *Random*)



Here is the result if you draw a straight line with the settings opposite : (Don't hesitate to modify the *Step* parameter if you need to change the distance between the flags)

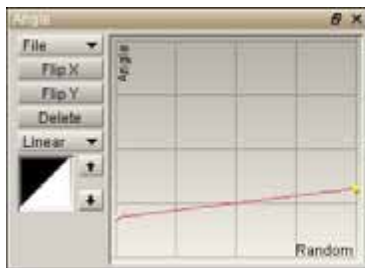
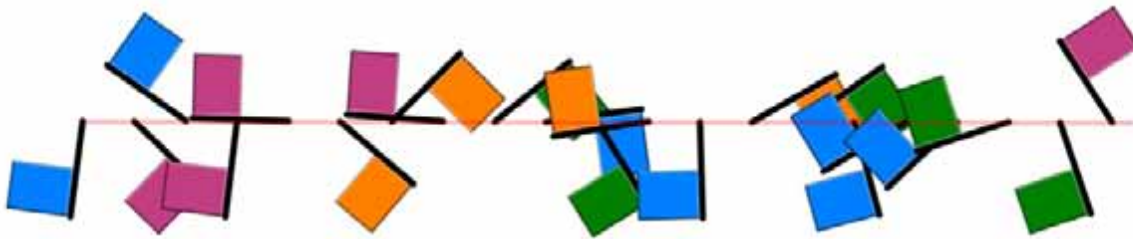


If we choose an angle of 90°, the result is monotonous ...





If we connect the animbrush *Angle* parameter to *Random*, the flags will be arranged in every directions. It is completely disordered ...



360° = 0°

Now let's modify the profile curve as shown hereafter :

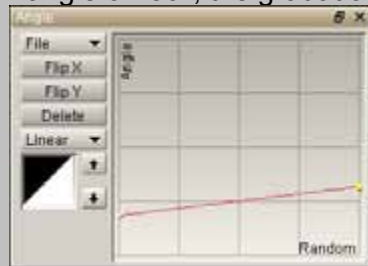
The angle of the animbrush will be randomly chosen between 80° and 100° compared to the horizontal axis. The general aspect will be less monotonous.

(each gradation represents 90°)



The minimal and maximal angular values on the vertical axis of the profile curve are the same as the one you have chosen in the tool panel of the current custom brush.

For instance, if you select an angle of -50°, the gradations will then be :



310° = -50°

220°

130°

40°

-50°

>>>

• Size and Random

We will now continue to work on the same example :



The purpose is now to make all the flags have a different size.

Of course, we can connect the *Size* parameter of the brush to *Random*.



Nevertheless a problem persist : we can have too small flags.

To remedy this, we only have to select a minimal size for our animbrush in the profile connection window.

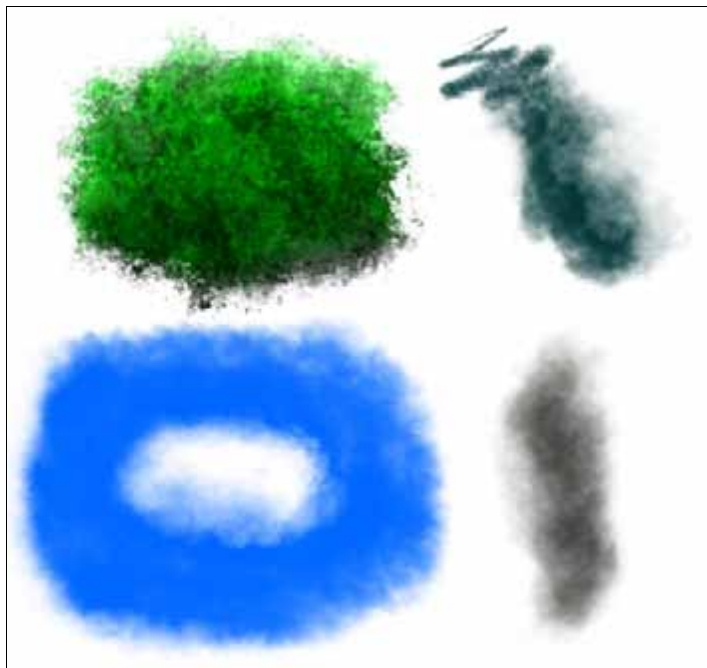
Opposite and below, some randomly selected values between 75% and 100% of the original size will be used.



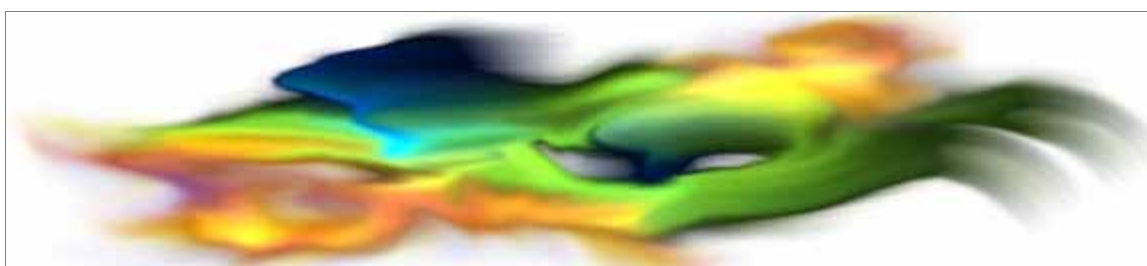
Use of the brush as a drawing tool

The use of predefined brushes and the connection parameters described above may produce spectacular results:

- * Tree leaves (*Luma stamp* mode with green *A* color and black *B* color and a randomly selected brush angle).
- * We used the same brush with the same mode but with red colors to draw the blood below.
- * Clouds (*Alpha stamp* mode with blue *A* color, *Angle* randomly selected and *Opacity* of the animated brush connected to the stylus pressure).
- * Smoke (*Size* of the brush chosen in *Random* mode, *Opacity* connected to *Fade ...*).
- * Ink (*Luma stamp* mode with *A* and *B* colors of your choice, *Size* connected to stylus *Azimuth*, *Angle* chosen in *Random* mode).



- * An animbrush using the *Add* mode can be applied directly on an empty layer and can be also shifted thanks to the *shift* option (see lesson 4). It could give very good result if you need to use some Oilbrush or Watercolor :



How to use the brush modes

As explained in lesson 4, it is possible to use the brush modes to modify their colors. This is very useful to create your own drawing tools. In the example below, the *A* color is red and the *B* color is Yellow.



The brush modes *Stamp Alpha* and *Stamp Alpha Max*

Thanks to the simple brush below, it is possible to create a powerful drawing tool. (We used the jitter and rotation parameters and connections to obtain better results)

However, some overlappings can become visible during your drawings. For example, if you go several time on the same place with your stylus.

The *Stamp Alpha Max* mode records the maximum opacity value of your brush pixels and uses it as a limit not to be exceeded during the drawing.

In other words, it remedies our overlapping problem.



(our brush)



Color mode



Alpha mode



Stamp Alpha Max mode



The *Shift* parameter does not work with the *Alpha* et *Alpha Max* modes.

The drawing tool panel : *Bin* tab



Two tabs are available for each drawing tool:
The *Options* tab you have already seen and the *Bin* tab.

Regardless of the tool you are using, you may save the settings applied (*Size, Power, Opacity, Angle, Profile, Connections, Gradient, Mode, etc.*) in order to use them again later.

Right click on the *Bin* tab window to check whether any predefined settings exist and to use them or create new settings if you feel they are required.

At this point we will study the *Bin* tab of the *custom brush* (the same applies to all other tools).

Right click on the empty area of the *Bin* tab to:

- * either *Add* the current brush to save it.
- * or *Get* a brush of your choice to be saved.

In both cases, a miniature of your brush appears under the tab.



The numbers next to the brushes indicate the number of animated brush images or size of the brush.

Right click on the brush in the tab to:

- * *Add* the current brush to the bin
- * *Get* the brush you just clicked on as current brush
- * *Swap* the current brush with the one you just clicked on
- * *Export* the brush
- * *Delete* the brush from the bin



Your settings will be saved if you click on *Save this configuration* when you leave the program. If you reset TVPaint Animation Pro's configuration, your settings will be lost.



Opposite you will find an example of the predefined animated brushes available in TVPaint Animation Pro.


The *Tool Bin* panel

The *Tool Bin* panel is the third custom panel present when you start the program for the first time. Located under the *Animator Panel*, it has the following form:




Although relatively basic at first sight, this panel is also very useful to store your brushes thanks to the first two buttons it contains.



The  is used to grab the current tool and place it in the panel under the two buttons. An icon is automatically created according to the tool to be used.



The second button  fulfils the same function as the first except that it grabs the tool together with the *A* and *B* colors active when the tool was grabbed.

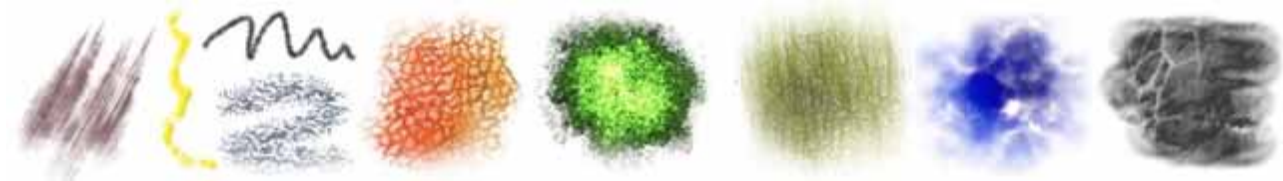
Now all you have to do is click on the icon of the tool grabbed in order to use it again. This proves extremely practical when you have specific drawing habits !



Please refer to the end of lesson 4, in order to learn how to cut your own animbrushes, and as a consequence create your own drawing tools.

Once you grab a tool with or without its colors, the current paper, the parameters and the connection profiles are taken into account. It is then possible to create and store more realistic drawing tools.

Furthermore, you are also free to create new panels for each type of tool and to save your favorite brushes which are easily identifiable !



Load and save the custom panel



A right click on the icon opposite of the *Tool Bar* allows to choose the custom panels which you want to be displayed.

It also allows to display and load new custom panels.

A lot of thematic custom panels (manga, pixel art, chinese brush, ...) are available in the *Contents-Sharing* section of our online forum. <http://www.tvpaint.com/forum/>



Be careful : when you save a custom panel, the papers linked to your tools are not saved. In other words, if you decide to save a custom panel, only the brushes and their settings will be saved on your harddrive.

This doesn't matter if you used the papers that are given by default with the software.

However, if you have created and used your own papers, you will have to save and load them separately. Your custom papers are located in the *Papers* sub-directory of your configuration. Here is the path for Mac and PC users :

C:\Documents and Settings\your_name\Application Data\TVpaint\your_config_name
\$ Home Directory/Library/tvpaint animation/your_config_name

The options relative to the custom panels are numerous : Create a new panel, a new button, grab a tool with colors, call a George script, import and export a panel, use a Plug-in, use the TVPaint commands, etc ...

They are all described in lesson 18 of this manual.

Selections and cutbrushes

Use the magic wand cutbrush



In lesson 4 we saw that it is possible to cut a rectangular, polygonal or freehand brush. It is also possible to use the *Magic wand* cutbrush.

Let's take a closer look at this function: don't worry, it's no sorcery!

When using the *Floodfill* tool, the boundary points (not filled in) are defined and the other points are colored (see lesson 6: adjustment of shape settings).

The same applies to our magic wand except that the «floodfill» area of the image becomes the current brush.

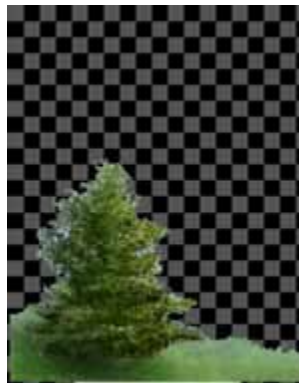
The current brush may therefore take all kinds of shapes.

For example, by adding the *Expand* and *Range* parameters, it is easy to obtain the following two brushes.



Original image

>>



Brush cutout



Working on a specific area on the screen

Selecting an area of the screen will allow you to work without changing anything in the area of the screen not selected.

For example, in the image below we have selected the cloud. Any drawing with your stylus will affect only the cloud.



Original image



Images with selection



You may also select an area of a layer and then make the modifications in another layer, for added safety.



If you have selected an area, using the *Delete image* icon in the main panel will only delete the selection.
The choice of a color channel for working also affects only your selection.

The various types of selections



Five icons in the main panel are used to enable these selections.

From left to right:

- * Rectangle select
- * Circle select
- * Freehand select
- * Spline select (refer to lesson 2 for further details about this type of spline)
- * Select with *Magic wand*



Regarding the function of the magic wand, refer to the section *Inking Process* in lesson 6.
In the present case, we create selections instead of filling surfaces, otherwise the mode remains identical...

Complex selections and brush creation

That's not all, the *Selection* tool window opposite extends the range of possible actions.



From the popup menu:

- * The *Add* and *Sub* options may be used to create complex selections: the *Add* option allows you to add a new selection to the previous selection while the *Sub* option, as the name implies, will remove the new selection from the previous selection. You may obviously combine various *Selection* tools with each other in order to obtain the required selection.
- * The effect of the *Replace* option is that drawing a new selection will automatically replace the previous selection.

- * The *Smooth* option works in the same way as that presented in lesson 3 to draw a filled rectangle.
- * When checked, the *Anti-Aliasing* box smoothes the contours of the future selection.
- * The *Invert* button inverts the current selection.
- * The *Clear* button deletes it.
- * The four buttons which follow are used to copy or cut the pixels contained in the selection and incorporate them in a new layer or new brush (animated brush or animation layer, if several images were selected previously).
- * The *Crop* button is used to create a new project containing only the contents of the selection. Your new project will contain an image or animation layer depending on whether you have selected one or several images in the current layer. If your current project contains several layers you will find the same number of layers in the new project.

The transformation tools



It is possible to transform all or part of several images using the three tools shown opposite: *Panning*, *Transform* and *Wrap*.

The *Panning* tool in the main panel



The *Panning* tool is used to shift an image or a selection on the screen with a left click + slide of the mouse.

The *Wrap* option enables you to « wrap » the image (see below).

* If you check the *Apply to image* box, the current image will be taken into consideration when shifting (see below).



Original image



Shift option



Wrap option

* If you check the *Apply to selection* box as well as the *Apply to image* box, the current selection will be taken into consideration when shifting (see below),



Original image with selection



Wrap option without selection

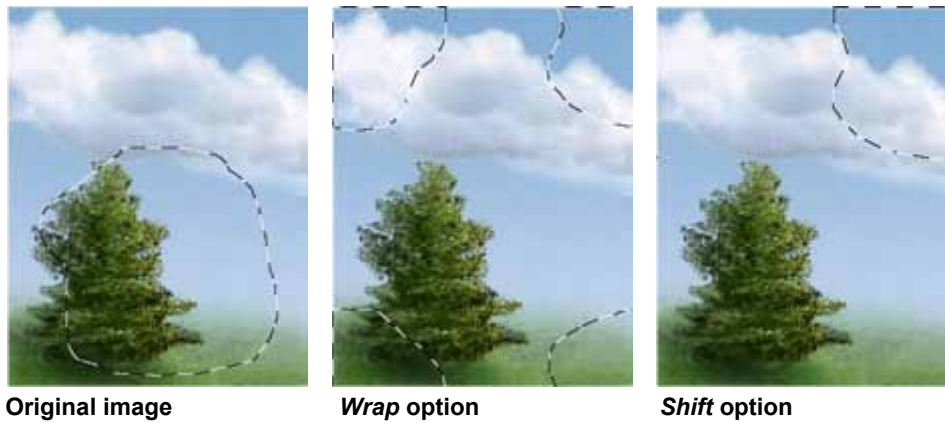


Wrap option with selection



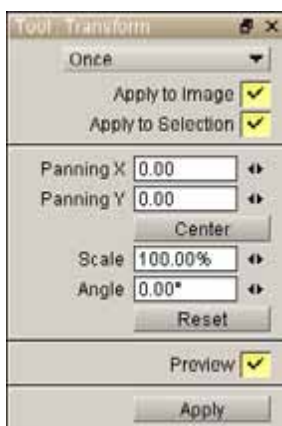
Shift option with selection

* If only the *Apply to selection* box is checked, the image will not change but only the selection.



* If the *AAliasing* box is checked, the image contours are smoothed.

The *Transform* tool in the main panel



The *Transform* tool in the main panel is used to shift, increase or reduce the image. Below you find a detailed description of the options proposed in this panel:

* The popup menu allows you to either *Shift* the image or to *Fill* the screen with the current image.

* As with the *Panning* tool, it is possible to shift the image and/or the selection (see examples below).

* The *Panning X* and *Panning Y* variables are used to translate the image on the screen. The *Center* button is used to re-center it.

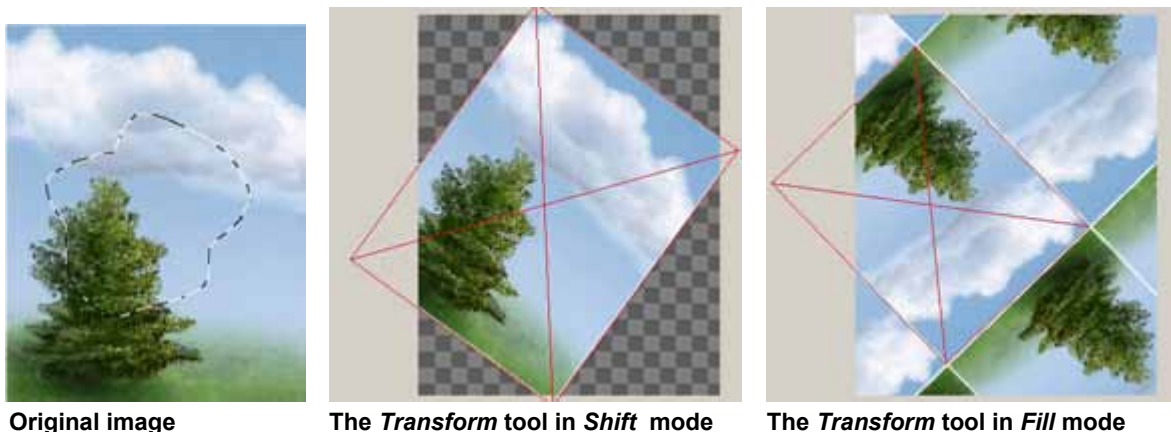
* The *Scale* variable is used to modify the size of the image (increase or decrease).

* The *Angle* variable is used to rotate the image.

* The *Reset* button resets the settings.

* The *Preview* box enables interactive viewing of the previous parameters on the screen.

* Once satisfied with the settings, the *Apply* button is pressed to finish the operation.



Original image

The *Transform* tool in *Shift* mode

The *Transform* tool in *Fill* mode



Panning tool applied to image and selection.

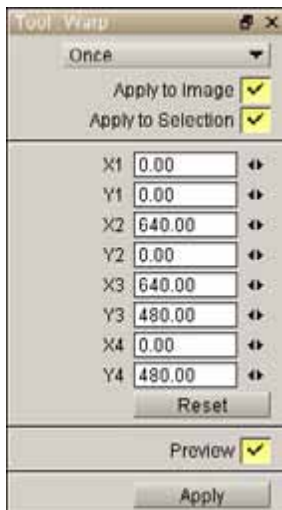


You may also work directly on the screen using the mouse:
 * left click and slide to modify panning.
 * right click and slide to modify size.



To shift all images of a layer, first select them all. Use the keyboard shortcut [Ctrl+S] or the contextual menu in the timeline.

The *Wrap* tool on the main panel



As the name implies, this tool is used to put the image or current selection into perspective.

A modification of the four corner coordinates of the image is sufficient to obtain a convincing effect.

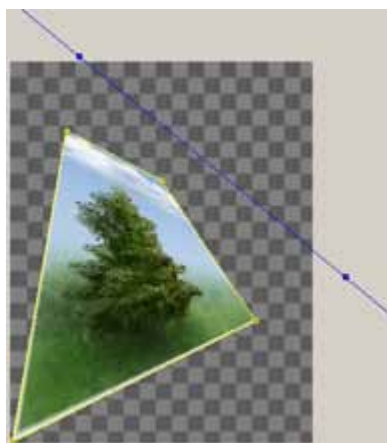
You may or may not fill the screen with the current image (see examples below).

Here again, the same system as above is used (*Preview* then *Apply*).

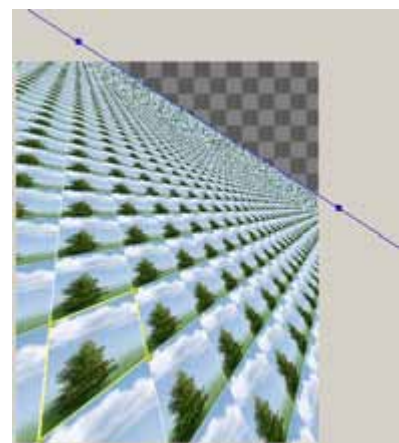
Use the *Reset* button to reset the settings.



Original image with selection



Wrap tool in *Shift* mode



Wrap tool in *Fill* mode



Wrap tool applied to the image and the selection



The blue line that appears on the screen during setting is the horizon line. You may move the two vanishing points as you wish to set the perspective.

Lesson 8

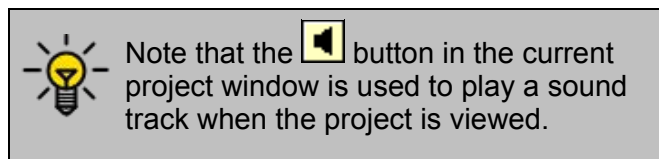
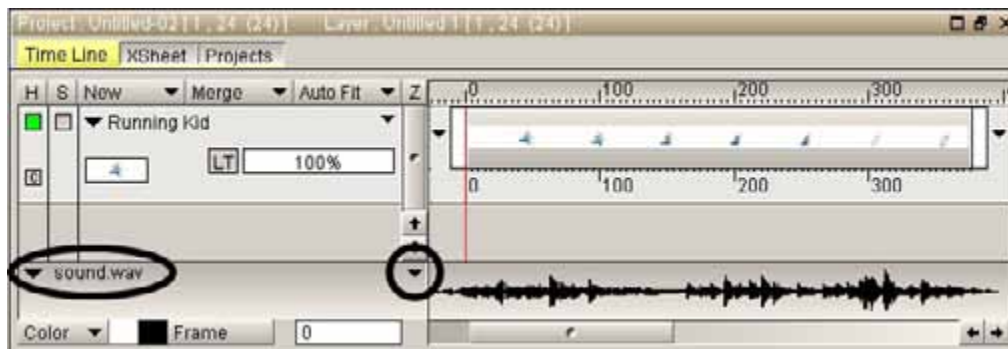
The XSheet panel and layers

In this lesson you will :

- Add a sound track to your project.
- Learn to use the XSheet layers.
- Learn to use the Spreadsheet panel.
- Make a Lip-Sync.

How to add an sound track to your project

The audio options are available in the *Project* main menu or in the *Sounds* menu of the timeline (encircled cursor ▼ below on the right).



Here are the various functions proposed by TVPaint Animation Pro :

* *Load* a sound track to be included in your project.

On the left of the timeline, the name of the loaded sound file will appear and another triangle ▼ will allow you to change the size of the track display :



Optimised display



Reduced display

* *Delete* a sound track from your current project

* It is possible to move the audio track along the timeline with a click and slide on the former. This function allows you to adjust synchronization of your animation and sound track.

* The *Offset* option enables synchronization using a numeric value

* The *Lock* option prevents all movement of your sound track with a click and slide. Once you have completed your settings, this option will allow you to avoid any risk of handling mistakes.

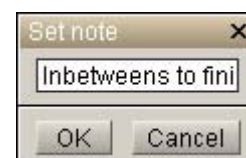
* If the jog audio is in *None* position, no sounds will be emitted when you move along the timeline.

* If the jog audio is in *Scrub* position, the sounds will only be emitted if your movements along the timeline is carried out with a mouse or stylus.

* If the jog audio is in *Always* position, the sounds will always be emitted when you move along the timeline, regardless of whether you use the mouse, stylus or keyboard arrow keys.

* If a sound is emitted each time you change the current image in the timeline, the option *Enter the scrub audio duration* allows you to define the duration of this sound.

* The *Notes* option is available when using the RMB on the sound area. It allows to add text in the TimeLine. Each cell of the Timeline can receive a note.



The XSheet Layers and XSheet Panel

Introduction and principle

Maybe are you not familiar with *XSheet layers* and *Lip-Sync* notions. Here are some informations regarding their origin :

The word *XSheet* comes from *eXposure-Sheet* or *dope-Sheet*.

It comes from the days of traditional animation when the XSheet was a paper list that numbered all frames of a scene and in which the animator could write down his drawing numbers with the right timing. (see below)

It helped the animators to plan their animations and also functionned as a guide for the cameraman to know how to shoot the scene.

For instance, synchronising the lips of a character with a recorded soundtrack (in other words doing a *Lip-Sync*) was possible with the XSheet.

SQ	SCENE	The drawings						SHEET
ACTION	DIAL	A	B	C	D	E	F	CAMERA INSTRUCTIONS
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

The *XSheet* panel, commonly called *XSheet tab* in TVPaint Animation Pro (see next pages) is the numeric transposition of the classical paper XSheet.

The reason *XSheet panels* were included in TVPaint Animation Pro is to make easier to time and synchronise the animations, thanks to the *XSheet layers*.

It is also a very usefull tool for people who uses to scan their drawings. The main advantage of the *XSheet layer* is that a frame that is used multiple times in a scene need only to be adjusted or colored once and all instances of this image in the *XSheet layer* will change accordingly.

It saves a lot of time since the process of copying and editing frames is much simpler and easier to control through the *XSheet panel*. (This is much simpler than the old way in which you'd have to manually copy and paste frames in the layers of the timeline.)

For example, let's assume that the coloring and the shadows of a character are on separate layers: If you need to re-arrange your animation in time, it is always very tedious to edit a layer in the same way twice or more ... Fortunately, with the *XSheet* panel this can be done really easily and quickly.

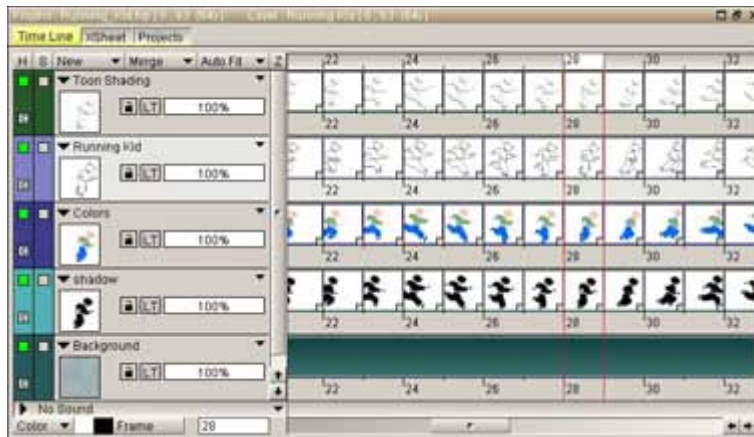
All those notions may seem abstract at first, but you can relax. We will quickly study some concrete situations and examples.

The projects used in this chapter

To make the XSheet layers easier to understand, we will need to load the project file (Running-Kid .tvp) from your TVPaint Animation Pro CD-Rom.

Those who have downloaded the (30 days trial) demo version of the software will find this file in the *content sharing* section of the TVPaint forum (www.TVPaint.com/forum/)

Once the project is loaded, you should obtain the following animation and timeline.



Five layers are visible: an image layer called « background » and four animation layers called « shadow », « colors », « Running Kid » and « Toonshading ». Each layer has its own assigned color.

Please note that your project does not have any XSheet layer at this time.

First approach of the XSheet panel

To swap between the Timeline and the XSheet panels, you only have to click on the corresponding tab (see below)



Let's study firstly the left part of the XSheet panel. (the right part will be the subject of a further chapter).

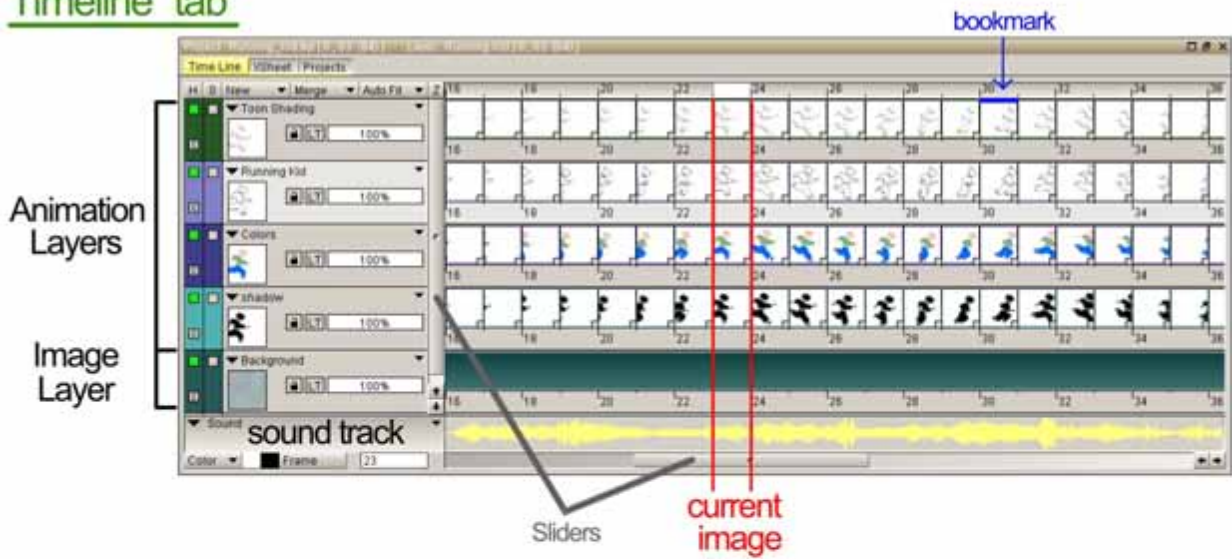
The left part of the *XSheet panel* is in a way the mirror of the *Timeline*. (see next page for the screenshots) :

- * Each column of the *XSheet Panel* corresponds to a layer of the *Timeline*, with its colour. The title of a column is the name of the corresponding layer.
- * Each line of the *XSheet panel* is numbered. This numbering is the same as the one you can find on the top of the corresponding timeline (see below)
- * The image layers contain an unique image repeated through the time, so they are not subdivided in the XSheet panel.
- * As the animation layers contain different images, they are subdivided.
- * The bookmark located here and there on your timeline are also visible and modifiable in the XSheet panel.

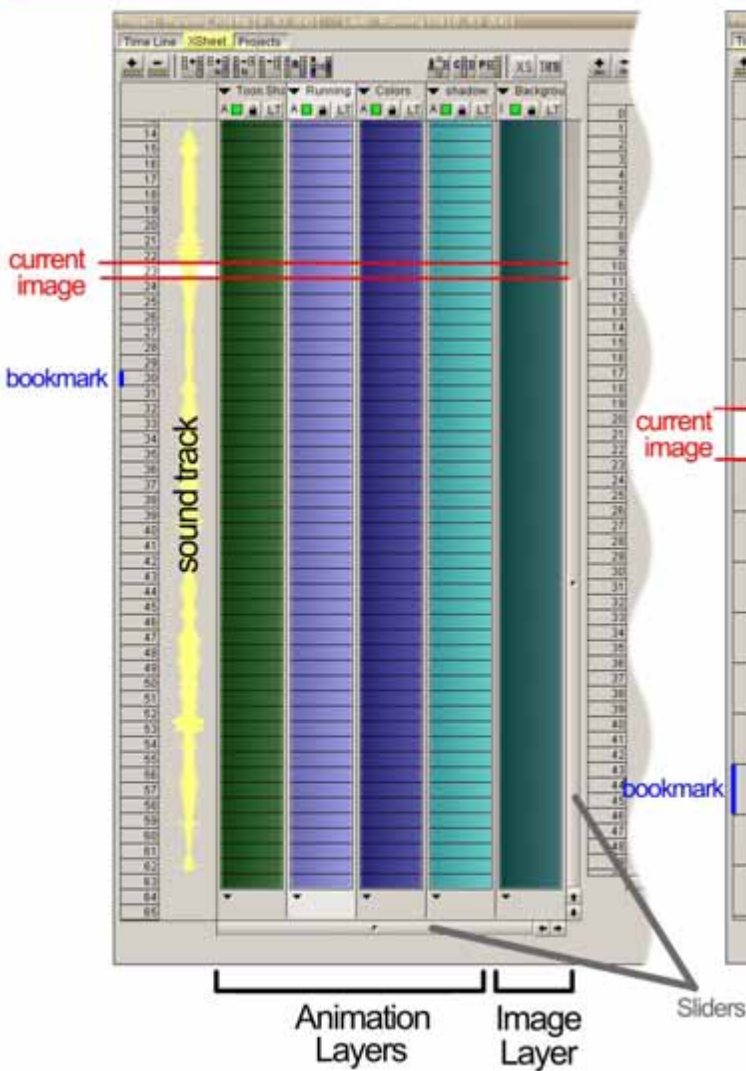


The thumb button allows to swap between the classical XSheet display and the thumbnails display. (see next page on the right)
You can also use the sliders or the arrow keys of your keyboard to navigate through the XSheet panel.

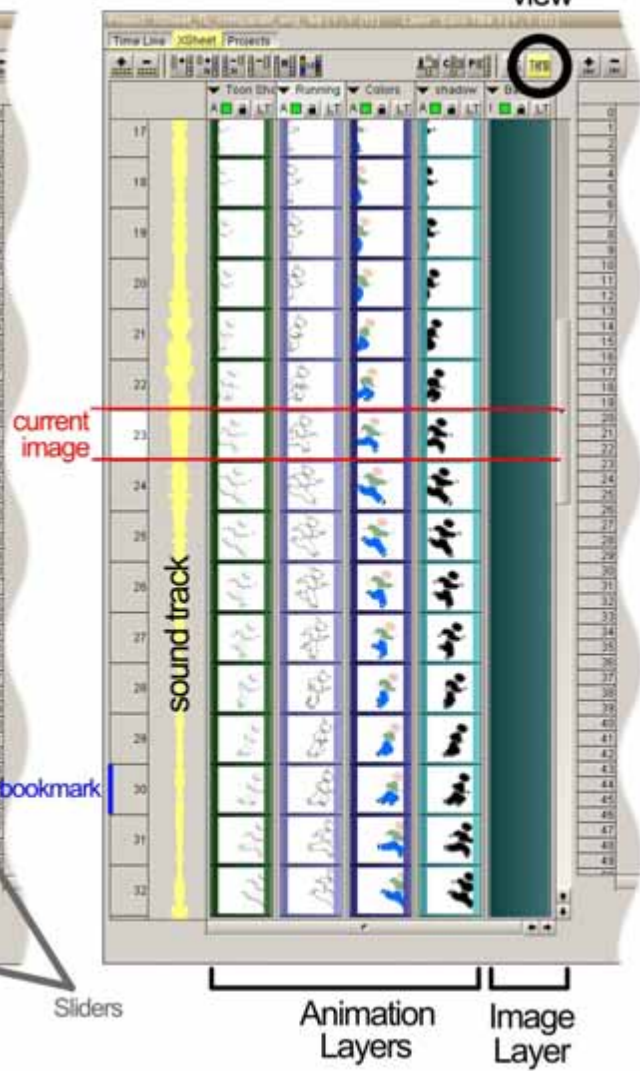
Timeline tab



XSheet tab (left part)



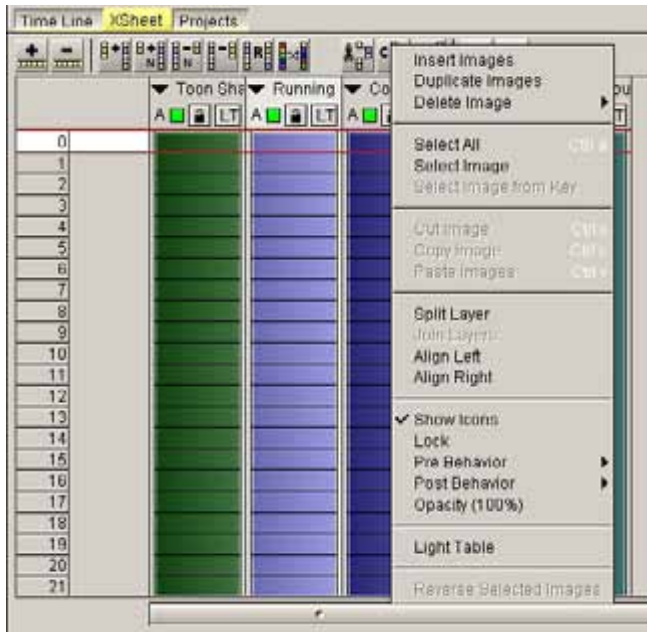
thumbnails view





The project tab above allows to manage the opened project. It is discussed in lesson 5.

A few simple options of the XSheet panel



A lot of option regarding the layers are both available in the Timeline tab and the XSheet tab.

A right click with your mouse button on a layer inside the XSheet panel opens a contextual menu comparable to the one encountered via the timeline.

You will find in this menu some options already encountered in the lessons 3 and 4:

- * Insert, Duplicate, Delete, Rename, Copy, Paste...one or more images.
- * Set Post or Pre behavior.
- * Set Opacity,
- etc ...



Timeline tab

- * The (green or red) coloured square, once you click on it, allows to display or hide the corresponding layer.
- * The small lock button allows to manage the locking of a layer.
- * The (LT) button manage the activation of the light table.
- * The black triangles allows to reduce or increase the size of the columns in the Xheet panel.
- * The current layer is lighter than the other layers.

Opposite and below :

- The « background » layer is hidden
- The « Toonshading » layer is locked
- The Lighttable of the « Colors » layer is activated
- The « Shadow » layer is reduced
- The « Running-Kid » layer is the current layer



XSheet tab

In the XSheet tab opposite :

- * The letter « A » indicates that the column represents an animation layer.
- * The letter « I » indicates that the column represents an image layer.

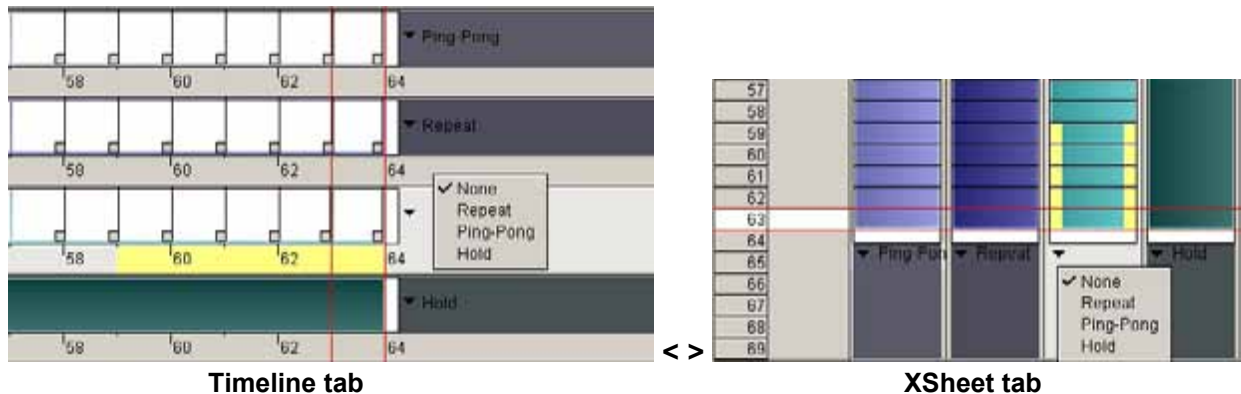


Before enabling the lighttable for the layer of your choice,
Don't forget to enable the global lighttable by clicking on the button :



At the ends of the column, it is still possible to set the pre and post behaviour of your layers. (see below)

In the example below, a few pictures from the third layer are selected. They are enlightened in yellow in the Timeline and also in the XSheet tab.

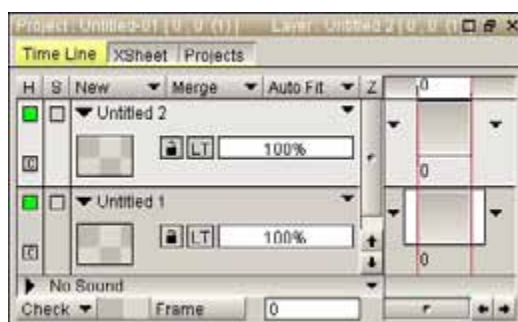
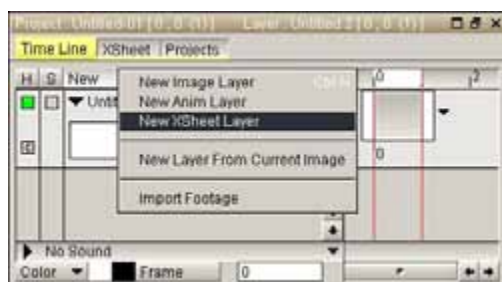


After selecting several layers, the option *Align left* and the option *Align right* allows to align your layers on either side of the current image in each tab (Timeline or XSheet)

How to create a XSheet layer

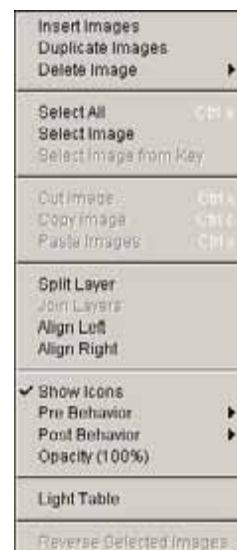
Let's now open a new project and come back to the Timeline tab :

You already know how to create an *Image* or an *Animation layer*. Creating an *XSheet* layer can be done using the same way, using the *New* popup menu of your Timeline or using the *Layer* main menu.

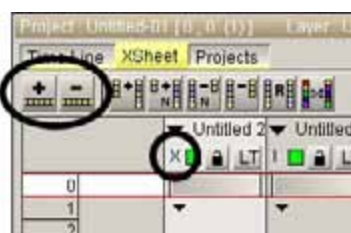


> XSheet Layer

> Animation Layer



At this state, the *Rename*, *Duplicate*, *Delete*, *Copy*, *Hide* and other classic options of the software are still available. But you certainly noticed that you can't shrink or stretch this new layer. There are no thumbnail icons too.



The + and - buttons of the XSheet tab can also be used to create or delete a XSheet layer.

The letter « X » indicates that the column represents an XSheet layer.

Managing the content of an image of the XSheet layer or managing the position in time of its images have to be done in the *XSheet* panel.

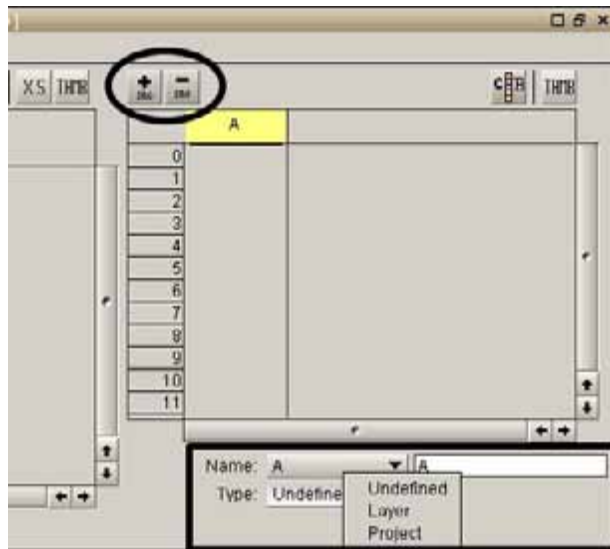
Once your XSheet layer is created, you have to specify in the XSheet tab one or more sources. Otherwise, it will be not possible to use it, because you can't draw on a XSheet layer. The images of the choosen sources will constitute the elements of the XSheet layer.

How to create and manage the sources

The source management can be done in the right part of the *XSheet* panel.

In order to add a source column, you have to use the “+ src” button encircled below.

The “- src” button allows to remove a source column from the right part of the XSheet tab.

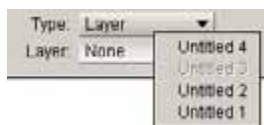


The choice of a source for your column can be easily done thanks to the popup menu located at the bottom right of the XSheet table.

Your source can be :

- * an animation layer in the current project
- * another opened project

It's also possible to change the names of your source layers, for a better readability. You only have to use the popup menu *name* opposite.



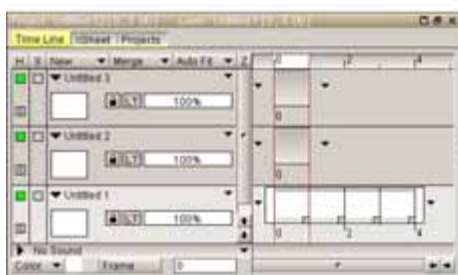
If more than one project or layer is open, a new menu will allow you to choose which one you want as source. (see opposite)
Image layers are not available as source.



The width of both sides of the XSheet tab can be adjusted by dragging the middle separator. The thumbnails options and the position of the separator are also saved with your project.



Do not confuse the source columns on the right part of the XSheet tab and the layers columns on the left part of the XSheet tab. The source columns are used to manage the content of the XSheet layers and are not visible in the timeline whereas the layers columns are also visible in the timeline. (see below)



Timeline



Layers columns

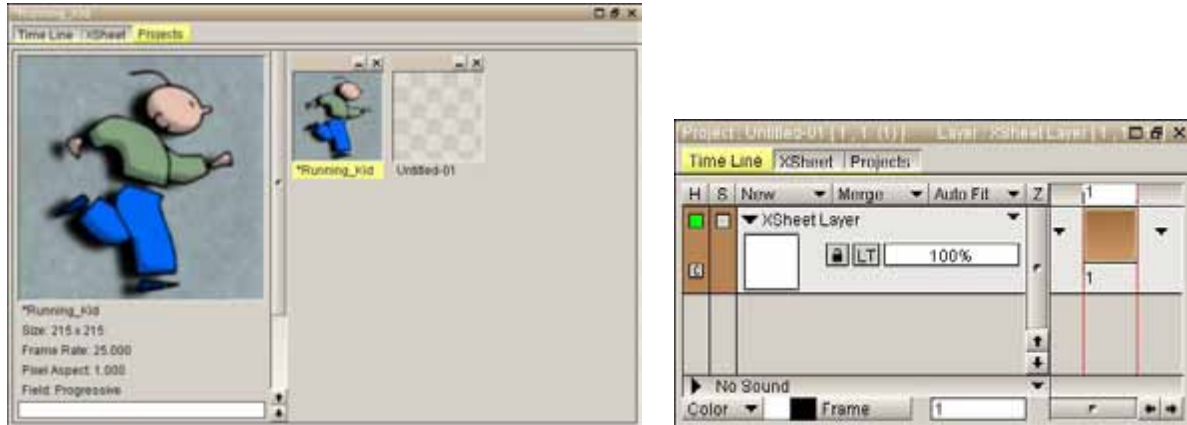
Source columns
for XSheet Layers

A concrete example

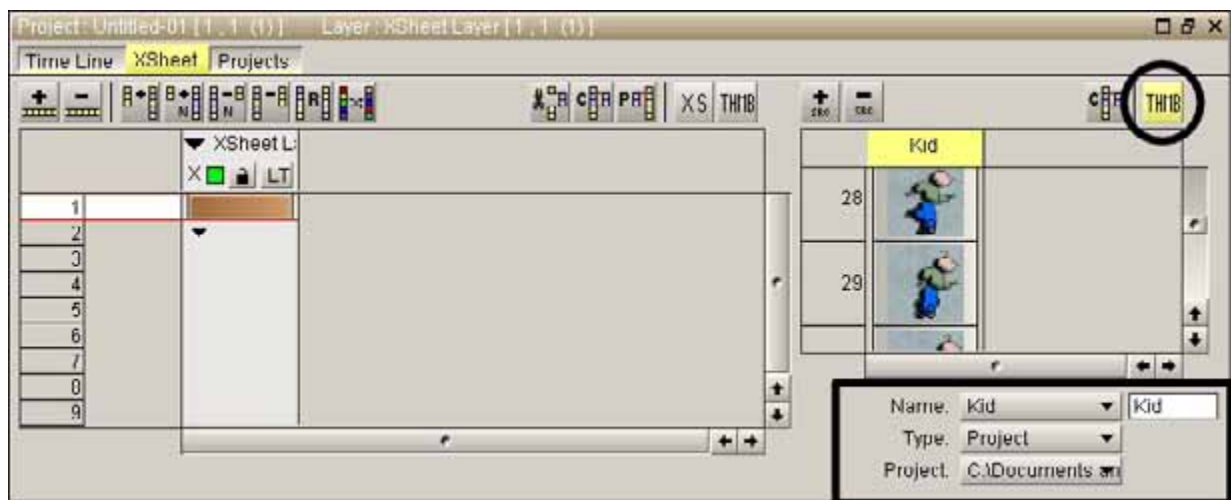
If you have followed this lesson from the beginning, you should have two projects on the TVPaint Animation Pro screen. The project *Running-Kid.tvp* and a new project called *Untitled-01* containing an XSheet layer.

You can take a look at the *Project* tab to check it.

The project *Untitled-01* has an XSheet layer. (see below)



In the project called *Untitled-01* we added the project *Running-Kid.tvp* as source, as shown below. Now we only have to add some images from our source into the XSheet layer.



Here again, the thumb button allows to swap between the XSheet display and the thumbnails display.



If you selected a project as source, its layers are considered as if they were merged.

How to manage the content of a XSheet layer

We are now going to modify the content of our XSheet layer.

*Before beginning, you must know that it is possible to stretch a XSheet layer by doing a drag'n drop at one of its extremities. So you can obtain several cells, as shown next page.

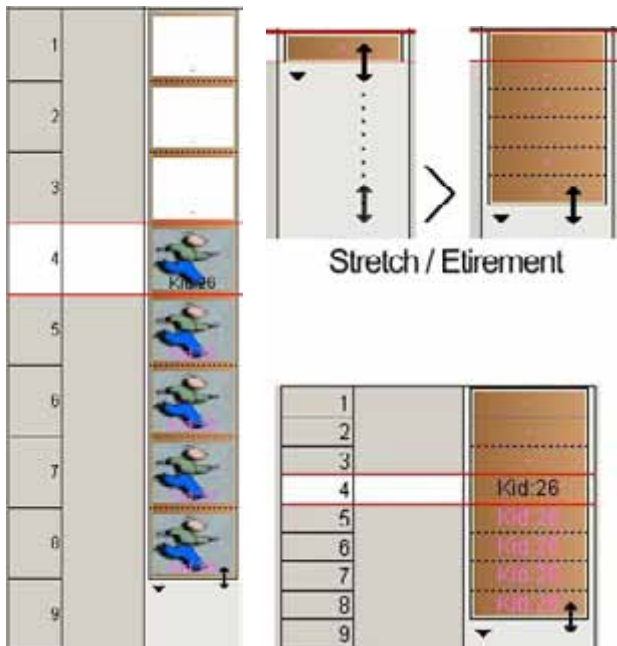
*After this operation, you have to enter in the cells the references from a source image.

To do so, you have to use the following syntax : **Source Column : Source Line**

(The cells containing the character « - » doesn't have any reference.)

* The cells manually filled have their reference image written in black.

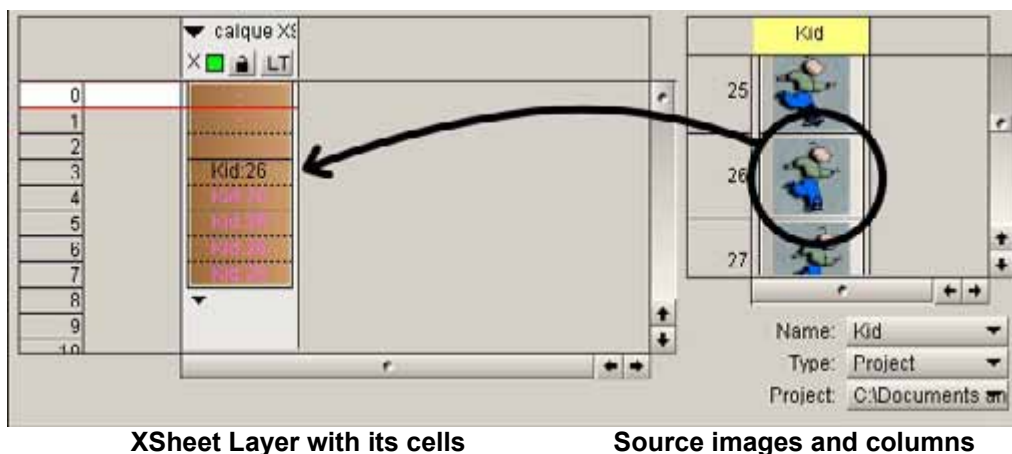
- * By default, all the cells following a manually filled cell are written in pink color and have the same reference image. Those images are also called keyframes.
- * Once finished, each cell from the XSheet layer correspond to an image choosen into the Source columns. (For a better readability, you can use the thumbnail view in order to replace each cells by its corresponding image)



Opposite, here is how to stretch an XSheet layer.

Opposite :

- * The first three cells of the exposition layer are empty.
- * The fourth cell of the XSheet layer is the 26th image from the source column called *Kid*.
- * The four last cells have the same reference as the fourth cell.



XSheet Layer with its cells

Source images and columns

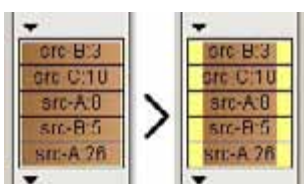


If you selected an opened project as source, the source project will be stretched to fit the XSheet layer.



In order to fill in the cells of an XSheet layer (in other words, to add images in a XSheet layer), you can also drag'n drop thumbnails and cells from the source columns into a XSheet layer.

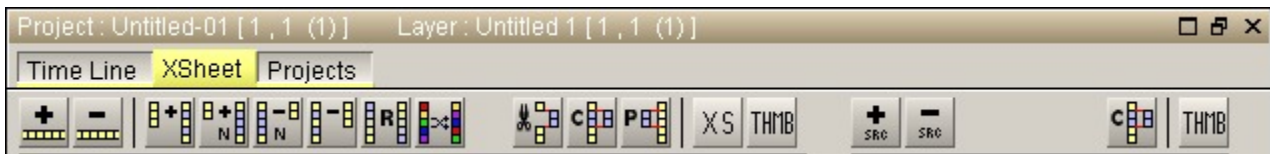
Select several images in a XSheet layer.



If you want to select several images in a XSheet layer, hold the [shift] key pressed and do a drag'n drop with the LMB on the cells or thumbnails of the XSheet layer. Use the mouse button to cancel the selection.

The icons of the XSheet tab

Each icons below has a specific action regarding the XSheet layer or the XSheet tab. We will now explain each of them separately in the next page.



This button creates a new XSheet Layer.



This button deletes the current XSheet Layer.



This button toggle the thumbnails / cells view.



For a better readability, the icon opposite allows to display / hide the columns of the image and animation layers in the XSheet panel.

This option is only working with the XSheet tab and does not interact with the timeline or the project display.



This button allows to add a source into the XSheet tab.



This button allows to delete a source from the XSheet tab.



This button allows to add one tween to each selected frames.



This button allows to delete one tween from each selected frames.



This button allows to add multiple tweens to each selected frames. A popup panel will appear to set the number of tweens to add.



This button allows to delete multiple tweens from each selected frame. A popup panel will appear to set the number of tweens to delete.



This button allows to invert the order of the selected frames.



This button allows to copy the selected images / cells. It can be either source images or images / cells from a XSheet layer.



This button allows to cut the selected images / cells from a XSheet layer.



This button allows to shuffle the selected images of a XSheet layer.

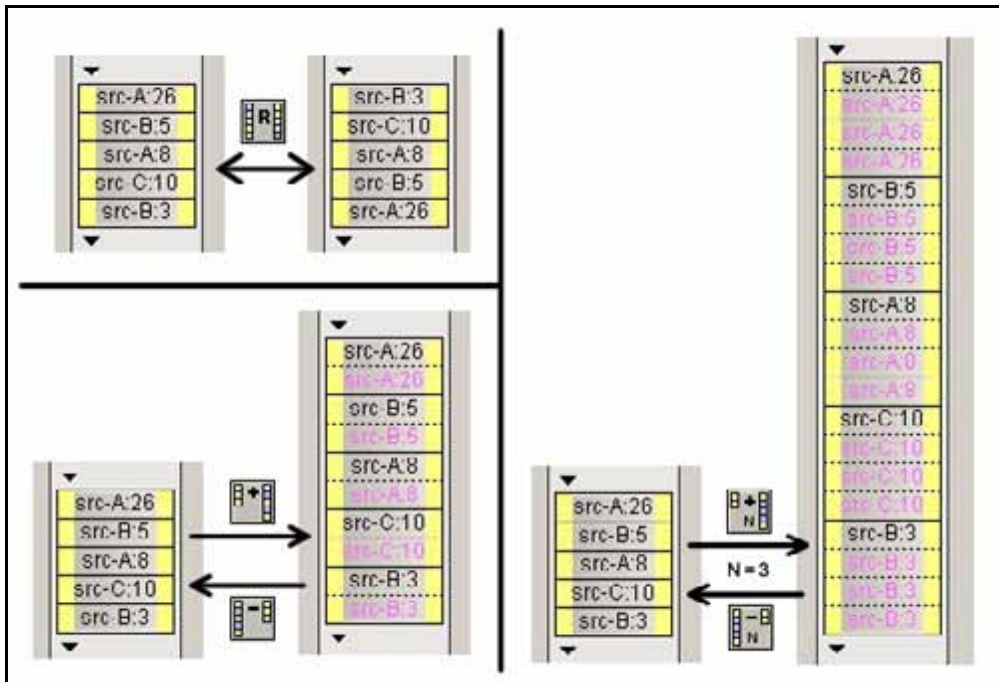


This button allows to paste the cut or copied images / cells from a XSheet layer into existing images / cells. This action delete the selected images and insert the new ones.



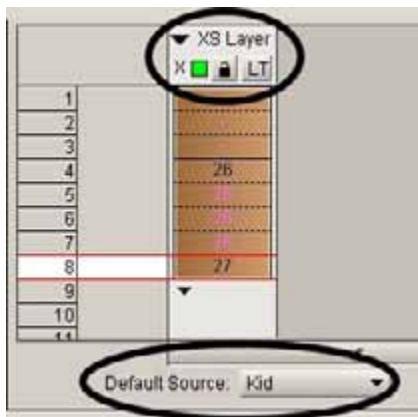
You can also use :
the LMB and drag to « move » (cut and paste) a selected range of frame.
Ctrl + LMB to « move » (copy and paste) a selected range of frame

Here is a small recapitulative diagram :



The options that allows to cut, copy, or paste the cells can be applied from an XSheet layer into itself or into another one. (however, it is not possible to cut source images)

Select a default source.



When you click on the name of your XSheet layer, a popup menu called *default source* appears at the bottom of the XSheet tab.

It is then possible to assign a source column by default to your XSheet layer : all the references of the cells will only need a number of picture in order to be taken into account.

This is very convenient to create new XSheet layers synchronised with the current one.

You only have to duplicate the current XSheet layer and change the default source of the duplicated XSheet layers.

About the projects

When a project needs some images to be repeated several times, it's advised to use XSheet layers. It allows to decrease the size of the project when you save it on your harddrive, because each repeated image is saved only one time.

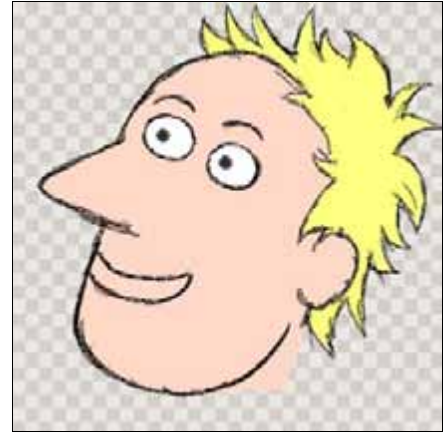


When you save a project in TVPaint Animation Pro, the related XSheet tab and layers are saved too. (Your project will still be available / usable with previous softwares from TVPaint. But, the XSheet and sound quotes layers will not be viewable nor usable.)

The steps to create a lip-sync

In this section, we will learn how to synchronize the facial movements of a character (especially his mouth) with a preloaded audio track.

The main idea is of course to give the impression that the words come from our animated character and not from a recording that has been added over an animated sequence.



The files used in this chapter

The project *Lipsync.tvp* and the audio track *voice.mp3* will be taken as a basis to study the lipsync steps. You can find them on the software CD rom. Those who downloaded the evaluation version of TVPaint Animation Pro can find those files in the “content sharing” section of our online forum. (<http://www.tvpaint.com/forum>)

Here is the timeline of the project Lipsync.tvp

Layer	Timeline Bar Color	Duration (Frames)
eyes	Light grey	1 to 5
pupils	Purple	1 to 7
brows	Light grey	1 to 7
face hair	Dark blue	1 to 7
hair color	Dark blue	1 to 7
mouth 4	Light grey	1 to 5
mouth 3	Light grey	1 to 5
mouth 2	Light grey	1 to 5
mouth 1	Light grey	1 to 5
jaw	Light grey	1 to 5
face color	Orange	1 to 5

Layer “eyes”

Layer “pupils”

Layer “brows”

Layer “face hair”

Layer “hair color”

Layer “mouth 4”

Layer “mouth 3”

Layer “mouth 2”

Layer “mouth 1”

Layer “jaw”

Layer “face-color”

We have chosen the following colors to have a better readability through the timeline:

- the layers relative to the mouth movements are in red.
- the layers relative to the jaw and face are in blue.
- the layers relative to the eyes movements are in purple.

If you play now this project, the result will not be really interesting. But we will quickly remedy this situation.

Calibrate the options relative to the audio track

Now that the project is loaded in TVPaint Animation Pro, let's import the audio track called voice.mp3.

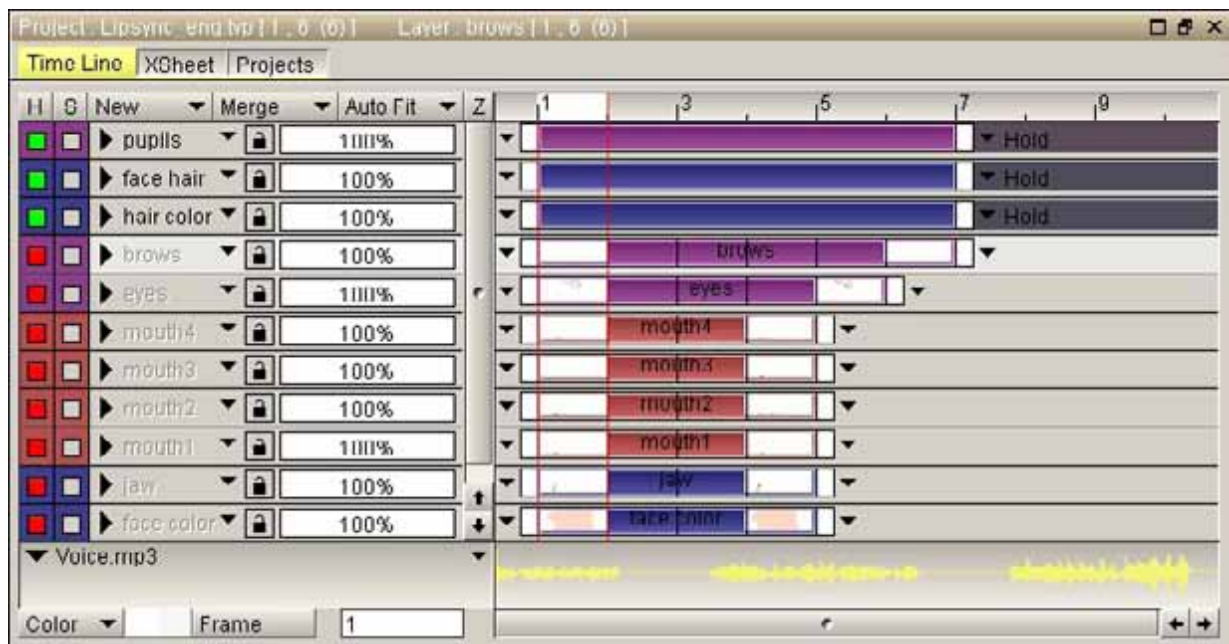
Once your audio track is loaded:

- * Begin by setting the offset parameter with accuracy
- * Lock your audio track in order to prevent unwanted changes
- * Select "movement" or "always" as parameter for the audio jog, with a duration of 2 or 3 seconds. (see first chapter for more details)



The option called: "Enter audio scrub duration" allows to specify the duration of the sound that you will hear after each movement throughout the timeline. (This option is functional only if the "jog audio" parameter is not in "none" mode.)

At this state of the process, your movements throughout the timeline should be followed by one or several sounds.



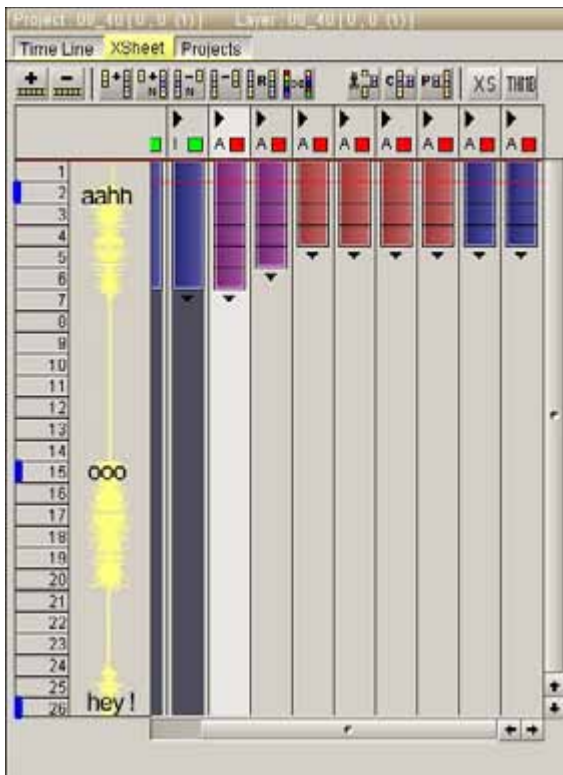
Positioning syllables and phonemes

It is now advised to display the XSheet panel in order to continue our work. (Although all the next coming steps can be done directly in the timeline.)

When you move your cursor (ie: change the current image) through the timeline, try to find syllables and phonemes.

Then, add an annotation on the corresponding place. To do so, use the option *Notes* which appears in the audio track contextual menu or in the *Images* main menu.

You should obtain a XSheet panel like the one below :



If the text that you want to synchronize with our character is long, try to add bookmarks to the images from which a syllable or phoneme starts. It will be easier to find again those images later.



You can already hide the animation layers. Those layers will not be visible when the project will be finished.

They are only here in order to be selected as source for the XSheet layers.

However, you can set *hold* as post-behavior for the Image layers. (they will stay visible until the end of the lip sync process)

You should obtain the image below :



Create some source columns

As explained on page 8, you have now to set your sources images and columns in the right part of the XSheet tab. Here below, the source columns are created from the existing animation layers of our project. (the column *fcolor* is linked to the layer *face color*)

	mouth1	mouth2	mouth3	mouth4	jaw	fcolor	eyes	brows
1								
2								
3								
4								
5								
6								

Create some XSheet layers

Now, let's create some XSheet layers.

For each sound of the audio track, the jaw and the face skin should move accordingly, as our character is talking. (see below)



The movement of the character's jaw



The movement of the face's skin

Two synchronised XSheet layers will be needed here to do the job. Only their default source column will be different. (fcolor and jaw)

Each sound of the audio track can be broken down into separated sequences :



opposite, the « O » sound



Here the « A » sound



The « I » sound



The « E » sound

Each time that the « O » « A » « I » or « E » sound will be encountered on the timeline, you will then have to reproduce the corresponding configuration.

A XSheet layer derivated from the two last described XSheet layers will be used here. However, it will not have a default source, because it will use the four source columns (mouth1 mouth2 mouth3 mouth4)

Finally, you will have to make the character blink periodically in another XSheet Layer.



The movement of the brows will depend on the context of the scene. It can express astonishment, neutrality, fatigue, etc ... It will also need an XSheet layer.



Here is the result with the XSheet tab :

The screenshot displays the XSheet tab in an animation software. The timeline on the left shows audio waveforms for 'nh', 'Hey!', and 'argh!!'. The XSheet layers are organized into columns for brows, eyes, Mouth, Jaw, and fcolor. The Mouth column shows a sequence of mouth shapes (mouth1.1 to mouth4.4) corresponding to the audio. To the right of the XSheet, a vertical timeline shows character headshots with frame numbers: 2, 13, 19, 25, 31, 40.



Let's assume that our character comes from an animated TV serie. It will be possible to re-use the same images for the face, XSheet layers constructed with the method,...etc...



You can always transform an XSheet layer into an Animation layer with Instances by using the *Transform into Animation Layer* option (use the layer contextual menu in the Timeline).

Lesson 9

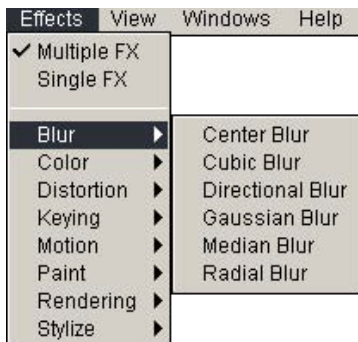
Working with the FX stack

In this lesson you will:

- Use the FX-Stack.
- Discover the concept of the animation keys.
- Create our first 'real world' animation.

In lessons 2 to 8 we have, amongst other things, studied the TVPaint Animation Pro drawing tools and discovered the timeline and its functions. You are now able to produce « frame by frame » drawings.

TVPaint Animation Pro also offers you a wide range of effects. This has been specially designed for working on animated footage.



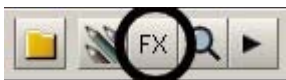
These effects or composition tools are available in the *Effects* main menu (see opposite).

They are arranged according to categories. We will study them progressively in the subsequent lessons.

The effects categories comprise:

- * Blur : to alter the existing pixels of the animation.
- * Colors : to rework the colors of an animated footage.
- * Distortion : to distort the images of a footage.
- * Keying : to cut out a part of the current animation.
- * Motion : to manage camera movement.
- * Paint : to repeat a line on the screen.
- * Rendering : to create lighting and particles effects.
- * Stylize : to rework the pixels of an animated footage.

The effect stack or FX stack



It is possible to set the parameters for your effects in a special window (for example : the power of a blur, the luminosity of the animated footage, the speed of a fade ...), this is the *FX stack*.

You call up the *FX stack* by clicking on the *FX* icon in the *tool bar* or by selecting *FX stack* panel in the *Windows* main menu.

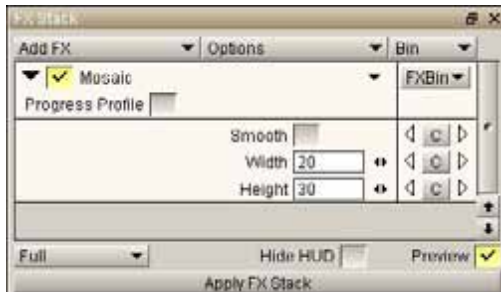


The popup *Add FX* menu contains all the effects indicated above: the menu is identical to the *Effects* main menu.

Initial study of the FX stack

Load the project named « house » which you have created in lesson 4. Merge it and spread the layer over thirty images. The resulting layer will be named « house ».

We obtain the following timeline and screen:



Our effect stack is presently empty. Select the effect *Stylize > Mosaic* from the menu. The effect stack must look like the one shown opposite. Now modify the parameters *Width* and *Height* by setting the values to 20 and 30.

The result is immediately visible on the current image: the image is cut in blocks of 20 pixels in width and 30 pixels in height (the color of a block is equal to the average of the pixels making up the block in the original image).

The *Smooth* button enables blending between adjacent blocks, the image obtained is therefore closer to the original image.



Original image



Image with preview of the effect

That said, the right image above is, in fact, for the moment only the preview of our mosaic effect (disabling the *Preview* button allows you to return to the original image).

To validate your settings and apply them into the current layer, all you have to do is apply your effect : click on the *Apply FX stack* button at the bottom of the *FX stack* window. Your current layer will be modified according to your settings (if required, use the *Undo* option to undo the modification...). Don't forget that all images of the layer must be selected if required.

Working in real time

Almost all software packages on the market impose a preparation stage and then an effect calculation stage. Viewing the final result on the screen is only possible after completing these two stages. In the best case, you have a window for a low-res preview of your effect at your disposal. TVPaint Animation Pro does not adhere to this model and employs a much more interactive method. You have the possibility to view the results of these effects in real time! Once the *Preview* box is checked, it is possible to play your complete animation using the *Play* button on the control panel. It will then be shown with all the modifications you have chosen in your stack.

In other words, any modification of the parameters within the effect stack is immediately visible on the screen, in full size and full resolution whether your project is a simple image or an animation. Sliding along the timeline using the keys [←] and [→] also allows you to view progress frame by frame.

The various viewing modes

- ✓ Show Preview
- Split Preview (Left)
- Split Preview (Right)
- Split Preview (Top)
- Split Preview (Bottom)
- No Preview

For the moment we will stay with our *Mosaic* effect.
There are several types of viewing: they are available in the popup menu at the bottom left of the *FX stack* window (see opposite).

You may view the effect on the entire image, its left half, its right half, the top or bottom... you may even modify the viewing area to your convenience by sliding the border line on the screen (to do this, left click on the line and slide it).



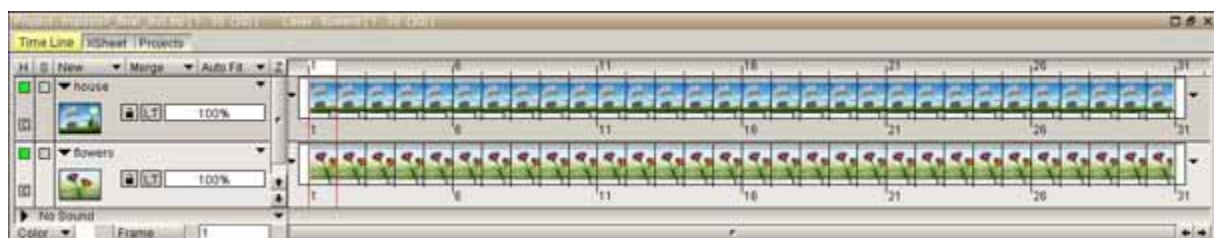
Here again, the *Play* button is pressed to preview your effect in real time but only on a given region of the screen.

Some operations

- * If you have applied the *Stylize > Mosaic* effect, click *Undo* to cancel the effect and return to the unmodified animation.
- * Go into the *Options* popup menu of the *FX stack* and choose *Delete all*.
Your stack is empty again.
- * Select the *Colors > Fade effect* from the available menu.
- * Add a second layer behind the current layer and name it « Flowers ».
- * Import the project « Flowers », merge it and spread it over 30 images.
- * Copy all the images of the layer obtained into the layer named « Flowers » in your project.
- * Finally, go to the first image on the timeline, on the layer named « house » (see timeline below).
- * Modify the value of the position parameter to 50% then apply the *FX-Stack*.



The « Flowers » Project



You obtain the following image:



You have certainly understood that this effect creates a fade between the image of the current layer and the image on the lower layers.

Indeed, but this effect is applied to the current image (the first) and not to all the images of the layer, ... so let's remedy this.

Click on *Undo* to find the layer named « house » intact.

Now select all the images of the layer and apply the *FX stack*.

The effect now applies to the entire layer.

This is not yet perfect: the fade effect is locked at 50% of its progress for all images of the layer... it does not evolve in time.



To obtain a true fade effect on the screen, one has to apply the *FX stack* with a position value : 0% for the first image, 1% for the second, 2% for the third ... and so on all the way to the last image... (assuming that our animated footage has a total length of 100 images... If not, complicated adjustment calculations must be made!).

At first sight this seems like a long and complicated process. Fortunately, TVPaint Animation Pro offers tools which reduce this fastidious process to a few seconds: the *Animation keys*.

Working with animation keys

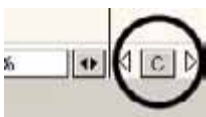
It is possible to set the parameters for our fade effect to 0% for the first image in our layer, then to 100 % for the last.

In this way TVPaint Animation Pro takes charge of calculating the progress of the effect on the intermediate frames.

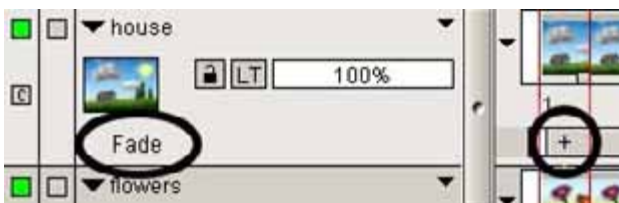
This is what we refer to as working with *Animation keys*.

Once this concept is understood, you will no longer work frame by frame.

Proceed in this way for our current project:



* Go onto the first image of the « house » animation layer. Set the effect to 0% then click on the button shown opposite.






* A symbol appears in the timeline (see opposite) under the first image.

The name of the *Fade* effect is written to the left of the timeline.

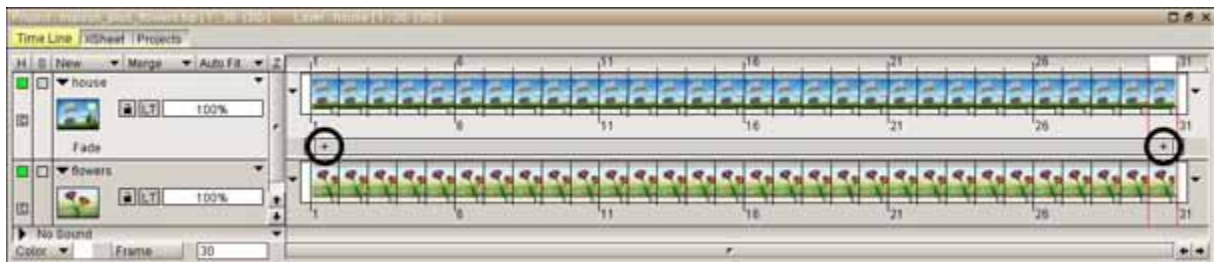
* The *Fade* effect is now set to a value of 0% for the first frame of the timeline. At this stage, application of the *FX stack* has no animation effect. Indeed, the value of this key will be repeated for all frames after this one.


It is necessary to create a second key before applying the *FX stack* in order to obtain an animation effect.

* Go on the last image of the « house » animation layer, create a key using the  button of the *FX stack*.

 You may now immediately set the effect to 100%. In this case it is not necessary to click on the button « **C** » as before and the key represented by the symbol  will be created automatically.

The timeline is modified as below:



* Note that by sliding along the timeline using the [←] and [→] keys of the keyboard or pressing the *Play*  button allows you to view the progress of the chosen effect from the first to the last frame.

* Now select all frames of the layer and apply the *FX stack*. This time, application of the effect stack will modify progression of the fade effect in time (see following images).



TVPaint Animation Pro has calculated an effect with a progressing position parameter for the intermediate frames.

To sum up, an animation key is a sort of adjustable time parameter lock which sets the value chosen by the user to a precise point in the timeline.

However, the drawing tool parameters vary dynamically according to the user's direct action on the project and may therefore not be assimilated to animation keys.

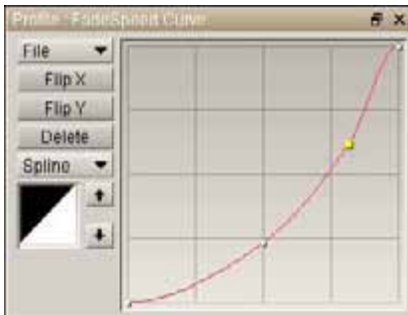
Manage the effect's progress

You have probably noticed the *Progress* button under the name of each effect. This button is used to manage the speed at which the chosen effect will be carried out.



Click on the *Progress* button and then on the small black section appearing on the screen (see opposite)

The Progress profile editor will then appear.



The interface of this window is identical to the one presented for brush profile setting in lesson 2.

The *File* and *Spline* menus, the *Flip X*, *Flip Y* and *Delete* buttons are the same as the ones you have studied before.

This being the case, the progress profile editor has a very specific function within the effect stack:

- * The abscissa in the graph represents time,
- * The ordinate in the graph represents the progress of the chosen effect.

Let's go back to the fade effect in the « house » layer:

- * Use the *Undo* option to recover the layers intact.
- * Choose the same keys as those indicated in the chapter above.
- * Draw the spline above before applying the *FX stack*.

After playing the project you will note that the effect is first carried out slowly and then at top speed (see timeline below). This corresponds to our spline : it rises slowly first and then very fast.

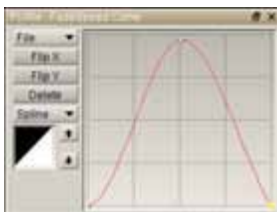


In the same way, if we choose the spline shown below before applying the *FX stack*, the *Fade* effect will be fast at the beginning and slower at the end.



Choosing a horizontal straight in the profile will stop progress in time of the effect.

If the spline rises and then falls off again, progress of the effect will change accordingly:

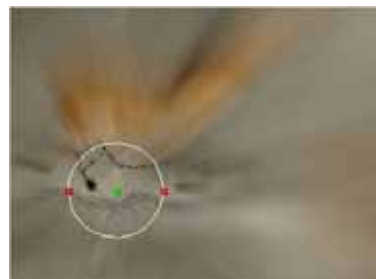
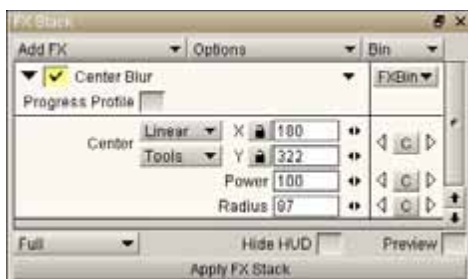
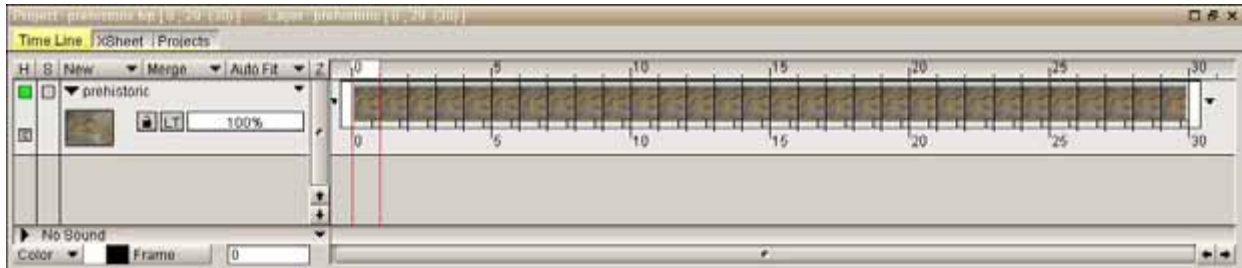


Managing effects with several parameters

Now close the « house » project and load the « prehistoric » project.

- * Merge the layers of this project.
- * Stretch them over thirty frames.
- * Delete the content of the *FX stack*.
- * Choose the *Blur > Center blur* effect.

The following timeline appears :



To make it easier we have deliberately chosen to work with an animation layer always containing the same image. Everything that follows also applies to an animation layer.

You will see that there are three parameters which may be locked with an animation key:

- * the position of the *center*,
- * the *power* of the blur,
- * the *radius* of the circle in which the blur is not applied.

The position of the circle in which the blur is not applied as well as its center are shown in the preview (see image above)



Some parameters may be adjusted directly on the screen by clicking and sliding the mouse on the color *handles* (shown opposite).

When the effect is applied, circle and handles will, of course, have disappeared.

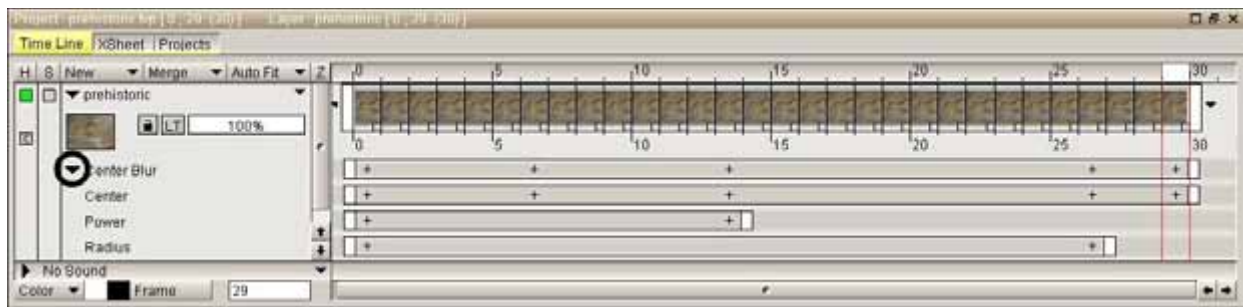
The parameters directly adjustable on the screen (handles, circles, spline) are referred to as *HUD* (*HUD* stands for *Head Up Display*).

The *Hide HUD* of the *FX stack* is used to hide the latter.

Now let's take a look at the timeline:

- * As soon as an animation key is created, a left click on the *Center Blur* triangle in the Timeline below displays the name of the parameter which have been set with the animation key.
- * To the right of the parameter names, corresponding key lines will be displayed as you create your keys.

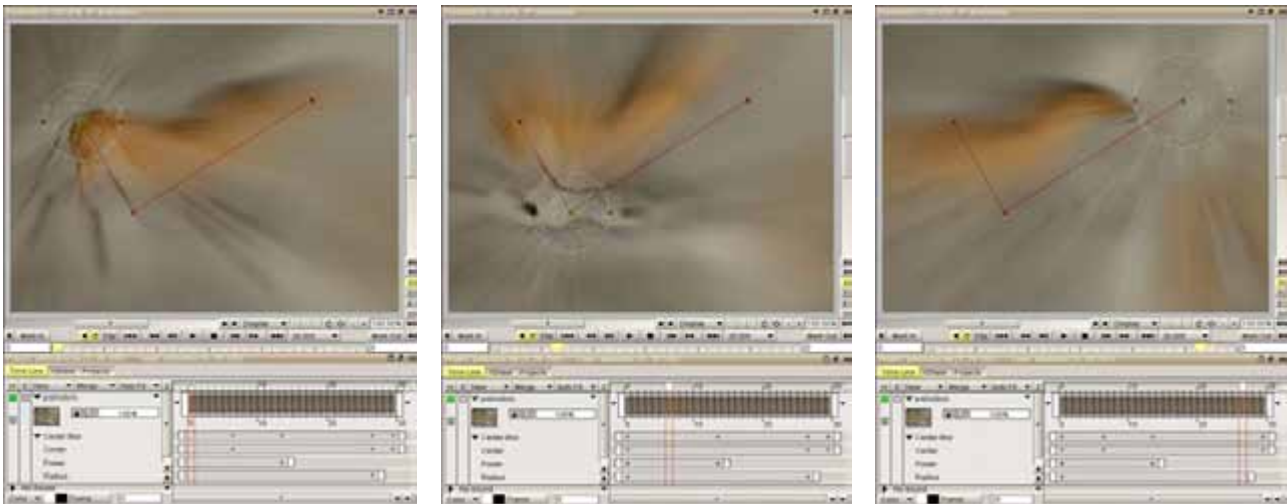
It is possible to create animation keys for each parameter, for the image of your choice along the timeline.



A separate set of keys may be created for each parameter (*Center* of circle, *Power*, *Radius*). This means that the parameters may progress in time independently of each other. For example: the power of the centered blur may decrease slowly while its radius may increase rapidly, all at different times ...

Thanks to several keys, the parameters can be adjusted in time. This is the case for the *Center* parameter in the timeline above : three animation keys are placed on the key line associated with the *Center* parameter.

Below, the effect produced using these three keys.



The first key line in the timeline has the name of the effect in the stack and displays all its keys.

The path

When position parameters progress in time, there must be a path taken by the parameter in question.

For example, three animation keys were created at the images 1, 6 and 30 for the *Center* parameter above.

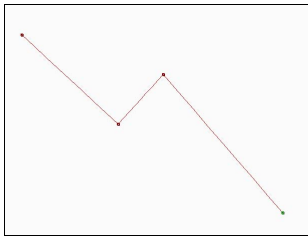
The center of the *Center blur* effect consequently follows a path as time progresses.

In our example, the path is visible via the *HUD* and looks a bit like a red « V ».

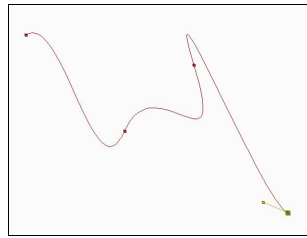


It is possible to choose an interpolation mode between the key points which define your paths.

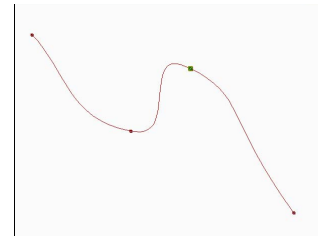
You may choose to connect the points in a linear, spline or smooth manner using the first menu of the effect (the *Tools* menu will be studied later in lesson 14).



Linear



Spline

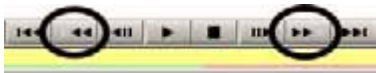
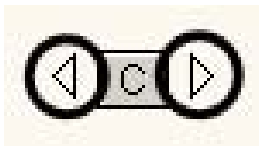


Smooth



When using *Spline*, it is possible to use handles. The [Ctrl] key + mouse click on a handle are used to move only this handle.

Moving from key to key



It is not always easy to place yourself on a key within the timeline, especially when the project contains many images. The « triangle » buttons in the effect stack or in the current project window (see opposite) are used to move rapidly from one key to another without having to use the [←] and [→] keys or the mouse. If they are in black, they indicate that there is an animation on the left or the right of the current position. Otherwise, there is no more animation key.

The contextual menu for the keys



A right click in the timeline on a « keyline » (see opposite), calls up a contextual menu.

You may :

- * create or delete keys (which requires confirmation),
- * select one or all keys (they will then be displayed in yellow...),
- * cut, copy, paste keys (a process already used for images and layers: see lesson 6).



When using animation keys:

- * The layer contextual menu offers the possibility to select the frames corresponding to the keyline.
- * The *Auto Fit* menu is used to adjust the zoom of the timeline in order to view the keys.

Contract, stretch a key line

In the previous lessons we learned how to contract or stretch an animation layer. This is also possible for key lines (see below).



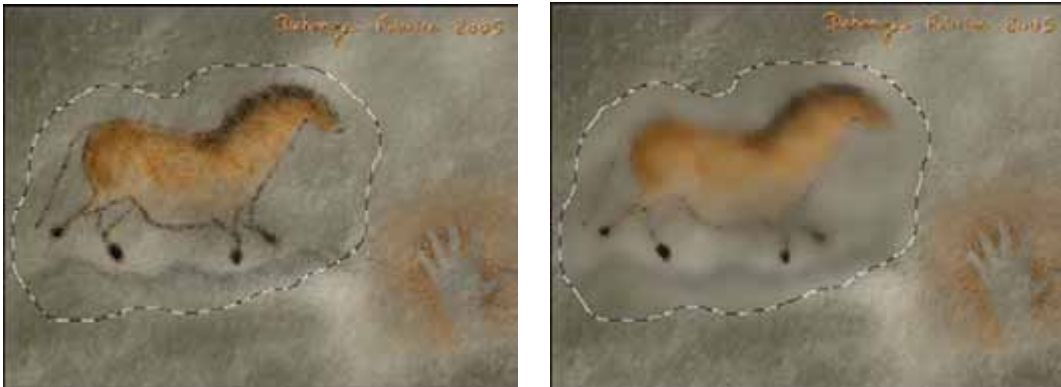
Stretch
Contract



If required, it is possible to move a key from one place to another in the timeline (click and slide with the left mouse button).

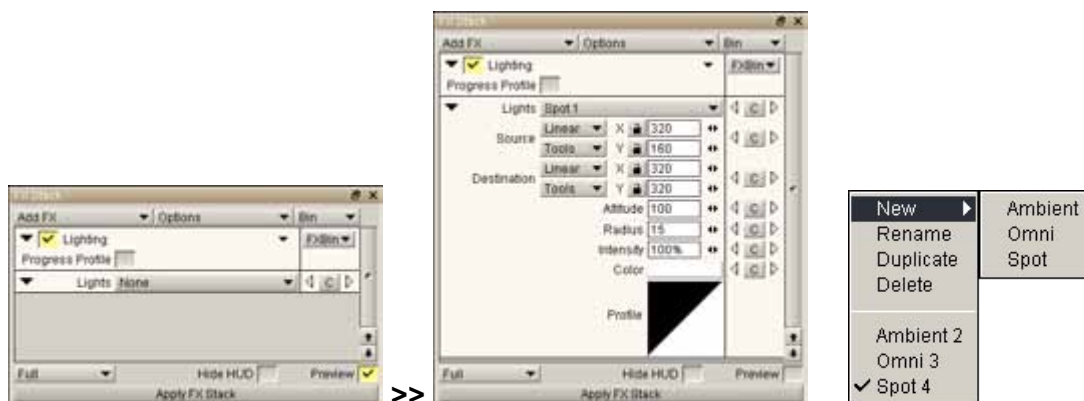
Use the selections

When you make a selection on the screen and then apply an *FX stack*, the latter is only applied to the selected area (whether you apply the stack to one or several images makes no difference). This is very useful when you apply your effect to a precise area in your image or animation.



More details about the FX stack

A more complex effect: the *Rendering > Lighting* effect



This effect is used to light up the image or sequence of your choice as if using an exterior light source (light, projector...).

By default, nothing is present in the list. The *Lights* menu may be used to create one or several lighting effects among the following categories: *Spot*, *Omni* and *Ambient*.

As soon as a lighting effect is created, you may duplicate, delete or rename it.

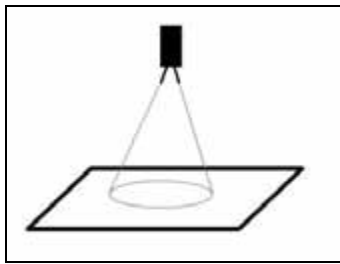
The *Lights* menu displays the name of the light whose parameters are shown in the stack. If you work with several lights you may go from one to the other by selecting their names in the *Lights* menu.

Here an overview of the different lighting types:

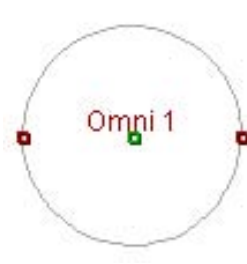
* *Ambient* lighting lights up the scene globally in the color of your choice. Values under 100% will darken the image, values higher than 100% will brighten it.

* *Omni* lighting lights up a circular area of your choice similar to a projector located on an axis perpendicular to the image. The parameters to be set are color, lighting intensity, center and radius of the circular area, as well as altitude of the virtual projector.





Omni projector diagram

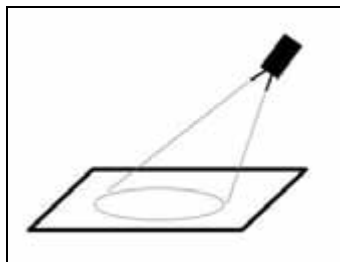


Omni HUD

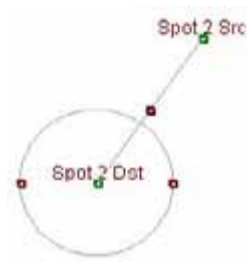


Omni lighting

* *Spot* lighting lights up the image similar to a tilted projector. Two position parameters are available for this mode, which allow you to adjust the position of the light source as well as its direction.



Spot projector diagram



Spot HUD

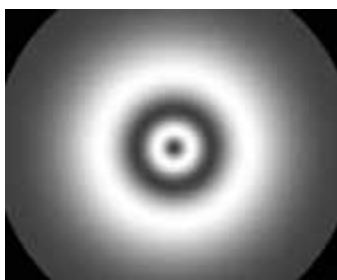


Spot lighting



For many of the parameters described above, the settings may be made directly on the screen (don't forget to display the HUD).

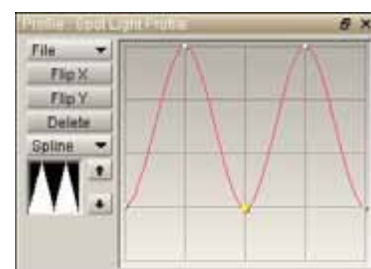
Spot and *Omni* lighting have a profile editor which works similarly to that of the drawing tools (see lesson 2 for more details).



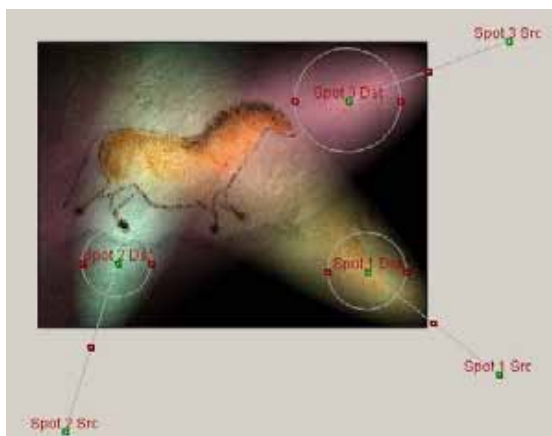
Omni



Spot



Profile



With the *Light* popup menu it is possible to use several light sources (regardless of type), as well as to *rename*, *duplicate* or *delete* them.

This is how our cave may be lit up in various ways !



This *Lighting* effect only applies to the opaque pixels of the current layer. To obtain the examples above it is therefore necessary to first merge the layers of our project.

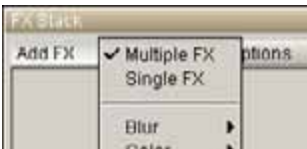
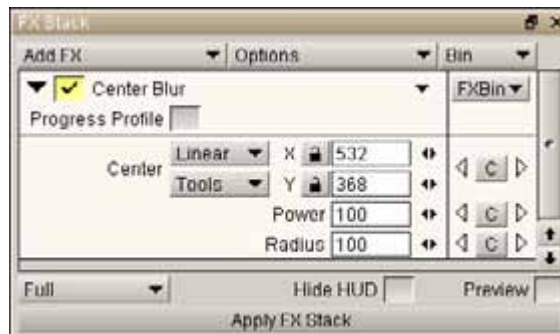
Single effects, multiple effects



Up to now we have only used a single effect in our stack. TVPaint Animation Pro also offers the possibility to use a succession of effects.

For a better understanding of this notion, we will use the merged « prehistoric » project that we have used before.

Using the parameters below, place a *Center blur* effect in your *FX stack*.
You now have the following preview:

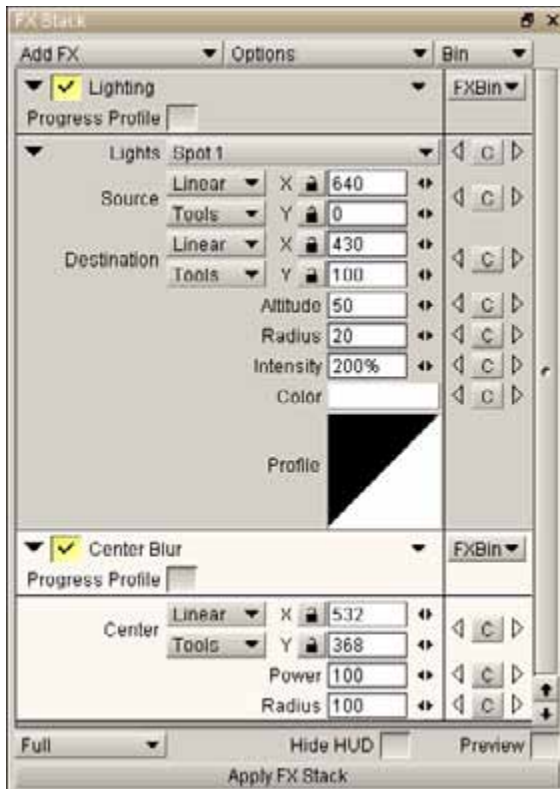


Maybe you noticed the options *Multiple FX* and *Simple FX* in the *Effects* main menu or in the *Add FX* popup menu of your stack.

If you select a new effect in the popup menu:

- * When *Multiple FX* is checked, the chosen effect is added to the present effect.
- * When *Simple FX* is checked, the chosen effect will replace the present effect.

Check *Multiple FX* in the menu and choose the *Rendering > Lighting* effect explained above: this effect will automatically position itself over the current effect.



Set the parameters for the two effects as shown opposite.

To simplify our example, there is only one type of lighting used and our effect applies only to one frame (so no key is required ...).

This said, everything that follows still applies if you use keys and animation layers.

Once the preview is enabled, you see the following result:
lighting is applied « above » the center blur of the previous page!

The advantage of our stack with two effects is that it is possible to modify any of the two effects at any time during the preview.

Modifications of this kind would indeed be very fastidious if you used a single effect at a time: application of the FX stack twice in a row for two different effects followed by the *Undo* option twice in a row, change the first effect, reapply the two effects one by one, *undo* option again, etc.



Result of the FX stack above



It is also possible to accumulate the number of effects of your choice or even several times the same effect if you need it!
Remember the *Play* button to view the effect on the animation layers ...

Current effect, preview and collapsing of effects

* One of the effects in your multiple FX stack is always selected. This effect is referred to as « current effect » (the one which seems to appear « brighter » while the other effects are « gray »). The keys visible in the timeline are always those of the current effect.

* When several effects are used, it is possible to collapse them using the ▼ buttons top left.

* The boxes close to the arrows indicated above are used to enable or disable the effect they belong to.

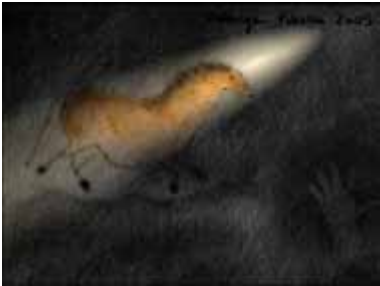


Opposite,

The *Lighting* effect is enabled and reduced.

The *Center blur* effect is disabled and visible.

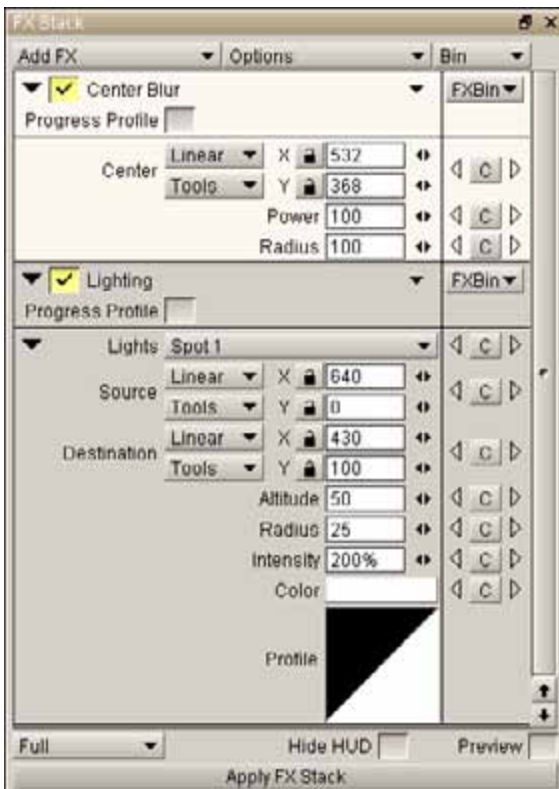
The current effect is the *Lighting* effect.



If the *FX stack* above is applied to our initial frame, we obtain the image shown opposite:

Only the *Lighting* effect is taken into account. There is no *Center Blur* applied before it.

Swap two effects



The effects contained in the stack are executed from bottom to top during preview or application. There is a kind of chronological order for the effects ...

The results may therefore vary if two effects are swapped:

* In the left image below, the *FX stack* applied is the one illustrated opposite.

The center blur is applied after lighting.

* In the right image below, the *FX stack* applied is the one illustrated on the previous page.

The center blur is applied before lighting.



Preview of the *FX stack* above



Preview of the *FX stack* of the previous page



It is also possible to swap the effects by clicking on and sliding its name. The process is identical to the one used to swap the layers in lesson 3.

Reset and rename effects



A left click on the right triangle above calls up a contextual menu which may be used to:

Rename the current effect in the *FX stack*, *Create* or *Delete* an animation key, *Reset* the effect parameters to their initial values, *Duplicate* or *Delete* the effect from your *FX stack*.



The *Options* menu of the effect stack may be used to delete or reset the values of all your effects.

Saving the settings of the *FX stack*

We have learned how to create and save our own graphic palettes, our settings of custom tools, our pre-defined gradients, etc. It is therefore only natural to proceed in the same way for our effects:

The *Bin FX* menu for each effect offers several options:

- * The *Add* option allows you to store your effect for later use (you will first be asked to name this effect).
- * The *Export* option saves the current effect to a storage support.
- * The *Import* option recovers an effect from a storage support.
- * The *Delete* option deletes an effect.



The effects added may only be re-used when re-opening the program if you save the configuration when quitting. Resetting the latter will delete all the effects of the user.

The *Bin FX* menu for the entire stack works in the same way, but may be used to add, import, export or delete an entire stack.



When you add an effect to a pre-defined effect stack, all keys and profiles relative to the progression of each effect you have created are also saved.

FX stack and TVPaint Animation Pro projects

We may be repeating ourselves, but it is important to remember that it is indispensable to *Apply the FX stack* so your effect is taken into consideration and affects the current layer (if not, all you do is preview it...).

Also note that, when you save a project, as well as saving the layers, their position and the associated parameters (*Position, Duration, Pre-Post-Behavior*, etc.) you also save the current effects stack.

This makes it possible to keep a complete and intact animation and the effect stack necessary for your finishing touches. Useful, isn't it?



When you work with several projects at the same time, note that each project has its own effect stack.

Introduction to the video effects

A lot of notions here need a good understanding of the multiple FX and FX-stack concepts. So it is advised to read the last chapters before beginning with this one.

Please note that we will only mention here the function of the effects and their place in the FX-stack.

The parameters and options of the effects will be described deeply from lesson 11 to lesson 17.

In this section, we will create a small opening sequence for a weather report .

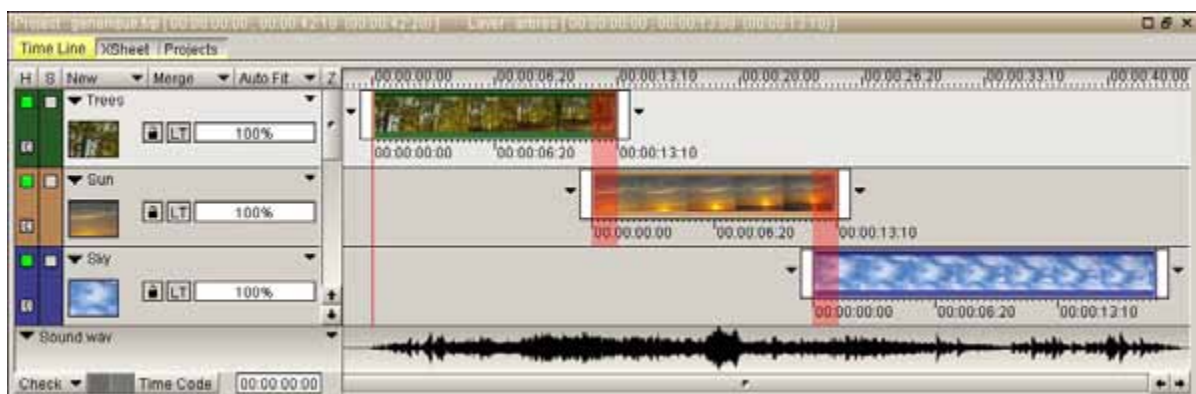
Do to so, we have several video sequences at our disposal :

The first one with a forest, another one with a sunset and the last one with some clouds

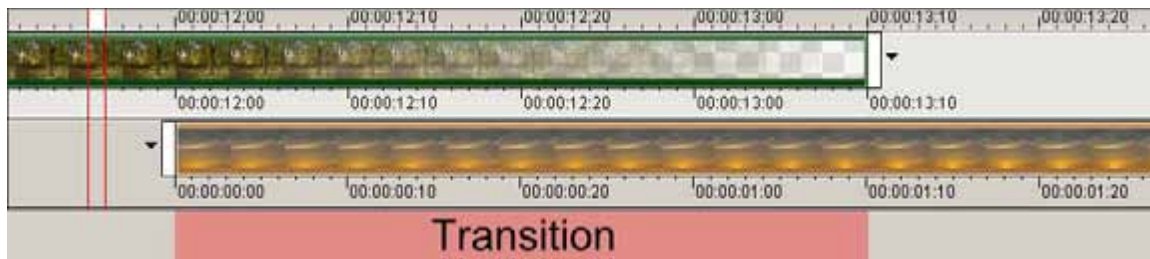


* Begin by importing those sequences in your project. Resize them if it is necessary. (note that the sequences can be directly imported from your camera into the software by using the *Video Grabber* panel). Don't forget to use a project with fields if your video sequences are fielded.

* Move them inside your timeline as shown below and import the music. A color has been added to the layers to make them more recognizable.



You should have three overlapped layers (look at red areas in the timeline above). This will help us to use the transition effects. Above, a transition effect has been applied on the first animation layer of the timeline. The zoom factor of the timeline has been increased to make it more visible.



Here is the resulting transition :



* To add a personal touch to our weather report, it is possible to use several effects :
Below, the *Blur > Radial Blur* effect was used. Therefore, the animated sequence appear progressively on screen.



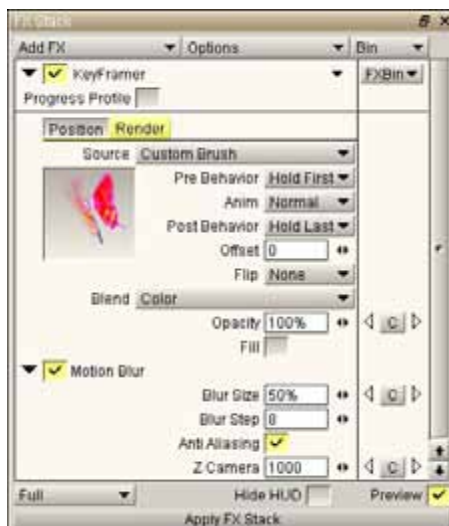
* You can easily make butterflies fly in front of the trees and make them follow the paths of your choice, as explained in the lesson 14 :



We used the butterfly animated brush (supplied on the TVPaint Animation Pro CD-Rom) with the *Motion > Keyframer* effect and a pre-recorded path for each butterfly.

Of course, our two butterflies can be added on a new layer : it will allow you to keep the «trees» animated layer unchanged.

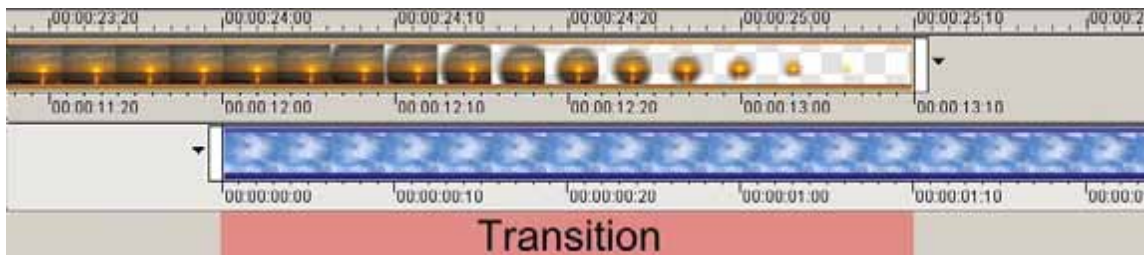
By using a new layer, you will also be able to change the moment when the butterflies have to appear : you only have to move the whole layer through the time axis of the timeline.



* We will now work on the “*Sunset*” animation layer : It is possible to distort the pictures to stay close to the weather report thema. This can be done by using the *Rendered > Waves* studied in lesson 13. Below we imitated two water waves, as if two rocks were thrown into water.



* We have afterwards to manage the transition between the «*Sunset*» and the «*Clouds*» animation layers. Below, the *Transition > Classic* effect with the *circle* option has been used. Here is the timeline and the rendering :



It is possible to modify the timeline scale thanks to the **Z** button of the timeline. (see lesson 4)

You can also use bookmarks to navigate easily through the timeline. (see lesson 4)

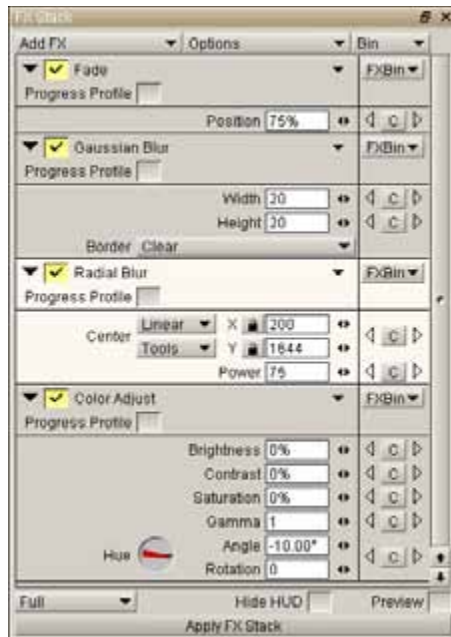
* Let's now add a rainbow in the cloudy sky :



To do so :

* Create a new layer (the *clouds* animation layer will remain intact)

* Draw a rectangle filled with the spectrum gradient, as shown opposite.



After this, you have to use a multiple FX-stack with these effects : (in order, from the first to the last)

* *Colors > Color Adjust* : the red area should be on the outside of the arc and the violet area on the inside.

* *Blur > Radial Blur* : this effect will allow you to create the arc itself. The center of the radial blur must be located far from the colored rectangle (out of the viewable area, to be exact).

* *Blur > Gaussian Blur* will merge the colors a little.

* *Transition > Fade* will make the rainbow fade in as time progresses.

Here is the result :



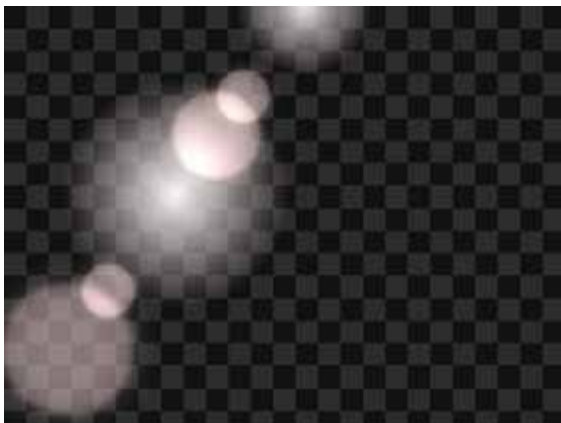
* Now, you only have to add a title to this sequence, thanks to the *Rendered > Simple-text* effect.



We used here the effect *Rendered > Simple-Text* (you can fill in the text, adjust the font, the border, the shadow, their colors or gradients ...)

This effect is very convenient because it allows to keep all the colors, border, font and shadow settings and to re-use them with another text line ... (for exemple if you need to do a translation)

* For the final touch, we need the *Rendered > Lens-flare* effect :

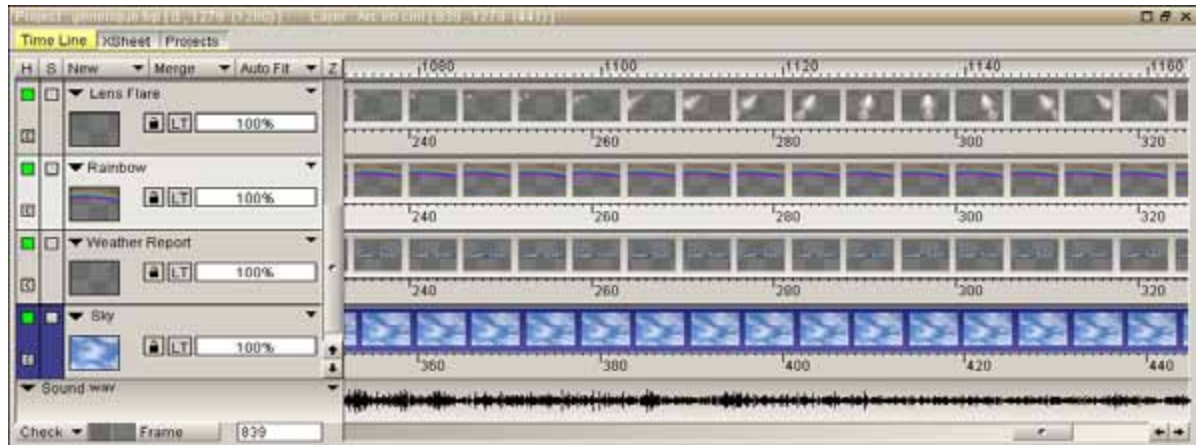


Lens-Flare effect on the check background



Here on a new animation layer

Here is the resulting timeline with the text, the rainbow and the Lens-Flare on separate animation layers.



And the animation itself :



Lesson 10

The effects of the *Blur* and *Transition* group

In this lesson you will:

- Discover the various Blur effects at your disposal.
- Discover the various Transition effects at your disposal.
- Learn how to increase the transition possibilities by using the FX-stack.

The *Blur* group effects

The blurs are often used to hide faces in recorded animations. Sometimes, they are also used to create artistic effects.

In order to study the effects of the Blur group, we will use the two pictures below : a photo and a drawing.



Independent of which blur effect you will choose, don't forget it will be controlled by the animation key system.
A recorded video sequence can also become gradually blurred in time.

Some details regarding the *Blur* effects of TVPaint Animation Pro :

The *Blur* > *Cubic Blur* effect

This is the most standard blur: the more you increase its size, the less the sharp and angular areas of the source image will be visible. It may also be applied only to the transparency channel of the image (alpha channel).



The *Blur* > *Gaussian Blur* effect

An image with a Gaussian Blur may be compared to an image seen through a camera that is not set correctly.

The Gaussian Blur is more precise than the *Cubic Blur*.



The *Blur* > *Chroma Blur* effect

The Chroma Blur takes only the tint and saturation pixel informations into account. The dark and light areas of the picture are not affected by the *Chroma Blur*. Only the chromatic component of the picture is affected by the blur.



The **Blur > Center Blur** effect

We studied the *Center Blur* in detail in lesson 9 about the FX-stack concept . The parameters are the position of the center, the power of the blur and the radius of the circle.



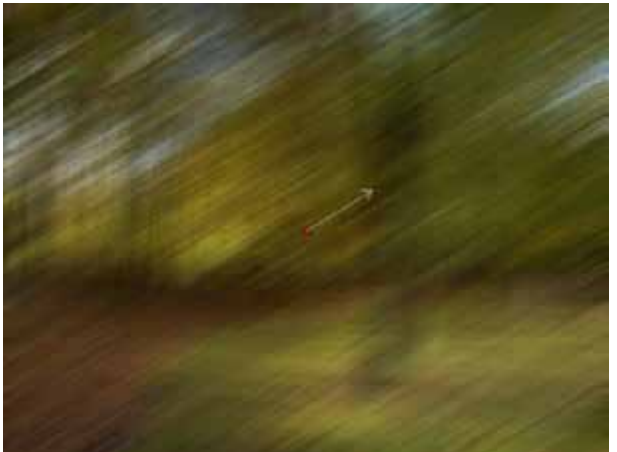
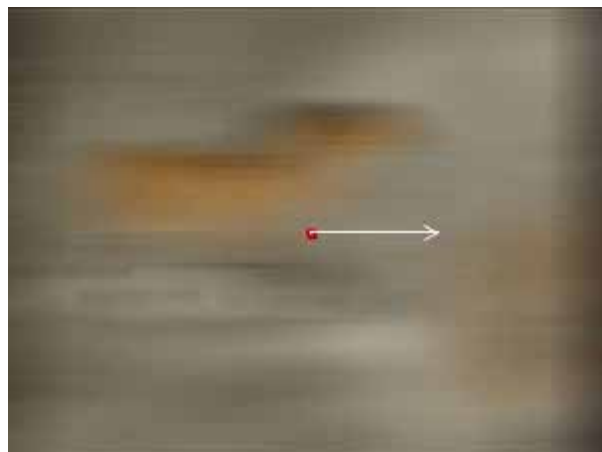
The **Blur > Radial Blur** effect

This blur is applied in a circular manner around a point the position of which you have chosen on the screen. The second parameter to be set is the power of the blur.



The **Blur > Directional Blur** effect

This blur is applied only in the direction (angle) of your choice and the spread of your choice. You may set the vector parameter directly on the screen.



The *Blur* > *Median Blur* effect

When using the *Median Blur*, the color of the pixels obtained after application of the blur depends on the colors of the adjacent pixels in the initial image.

The Median Blur comprises all kinds of modes, the effects of which you may admire below :

Median Blur* in *Smooth* mode effect**Median Blur* in *Light halo* mode effect*****Median Blur* in *Dark halo* mode effect**

Median Blur in Light mark mode effect



Median Blur in Dark mark mode effect



Median Blur in Double edge mode effect



Median Blur in Impressionist mode effect



The Transition group effects

All transition effects in TVPaint Animation Pro have a position parameter which requires the use of the animation key system (as described in lesson 9).

As well, we chose to make this parameter vary between 0% and 100% for each transition effect in order to show you their specifications. A setting of 0% will leave the picture intact and a setting of 100% clears the picture (100% transparent).

In order to study the effects of the Transition group, we will use the picture below.



Be careful that the transitions are made between the frames and a full transparent image.

Transitions are not transformations between two pictures.



The Transition > Block effect

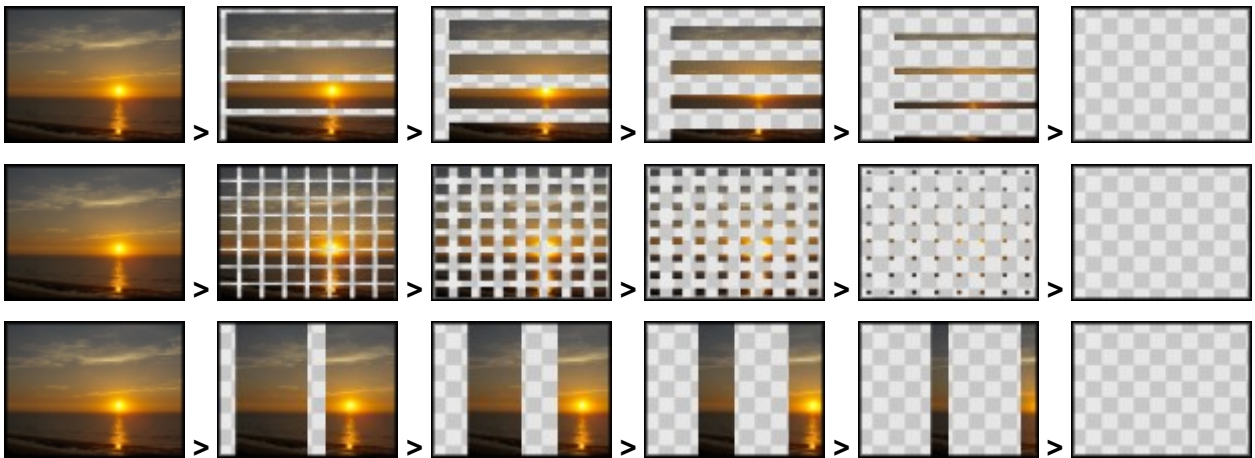
In this effect, you can adjust the number of rows and columns which will create blocks. To set the number of blocks, you just have to increase these two values. You can also select the way these blocks will appear or disappear on screen : random or in a direction you want.



The *Transition* > *Blind* effect

This transition hides progressively a part of the current image. The numeric field value represent the number of division on the screen.

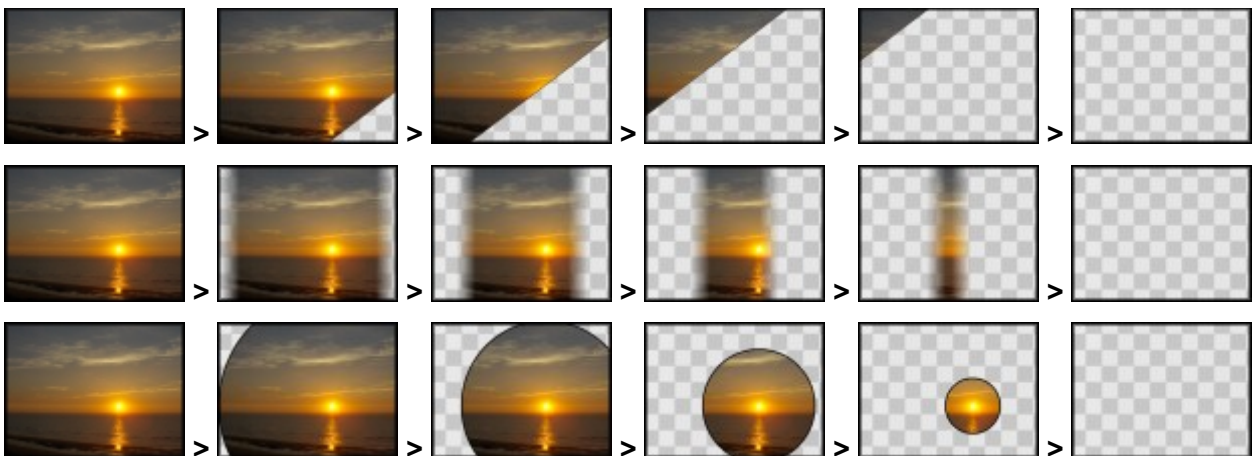
There are three types giving different results : *crop*, *slide* and *stretch*.



The *Transition* > *Classic* effect

Classic transitions makes the current image appear or disappear by moving a frontier. This one can have different shapes (circle, line, rectangle), as well as the color you want or even be faded. In case of circles and rectangles, you can adjust the position of the center of the shape.

The *linear* and *tools* menu will be explained in the lesson introducing the *Motion* group effects.



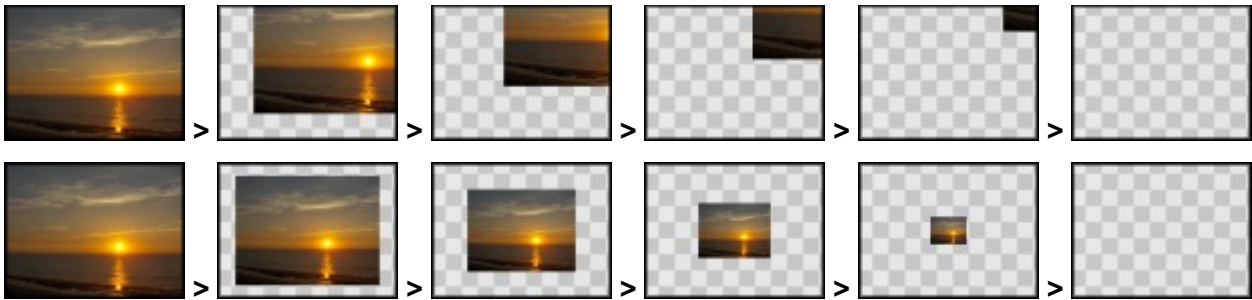
The *Transition* > *Fade* effect

The Fade transition is the most common transition ever used and does not need any other settings than Position. It was also introduced in lesson 9.



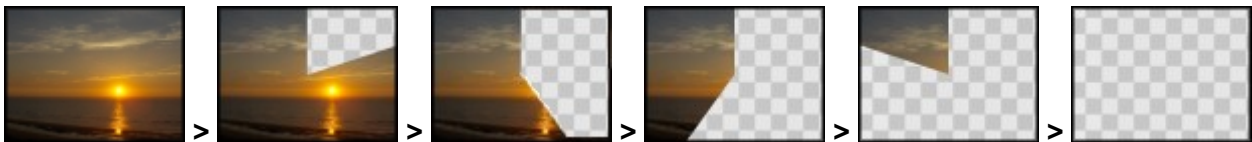
The *Transition* > *Slide* effect

The Slide transition moves your video in a predefined direction you have to select. You just have to select the direction in the Direction menu.



The *Transition* > *Rotary* effect

This transition clears the image following the movement of a clock's hands. The checkbox allows you to select the direction of movement and the menu is used to select the center on which the effect will be applied.

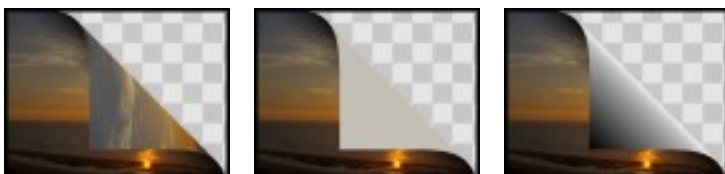


The *Transition* > *Page Turn* effect

This transition effect acts as if a paper sheet was removed from the screen. You can choose to turn the page from the window border you want thanks to the Direction menu.



There are three modes : *image*, *color* and *gradient* as shown below :



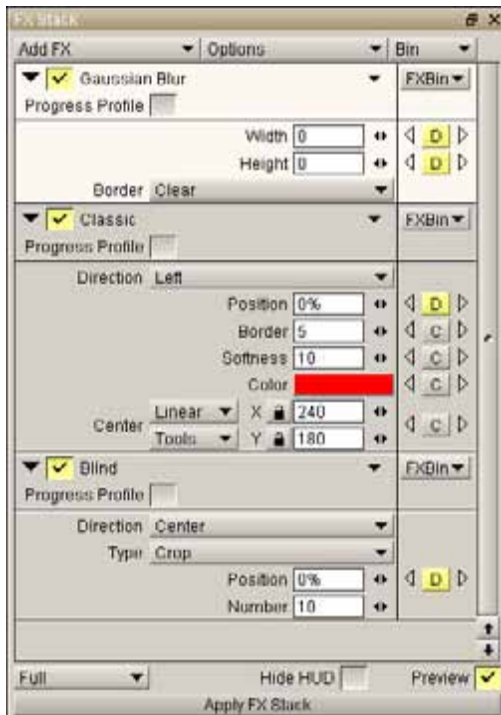
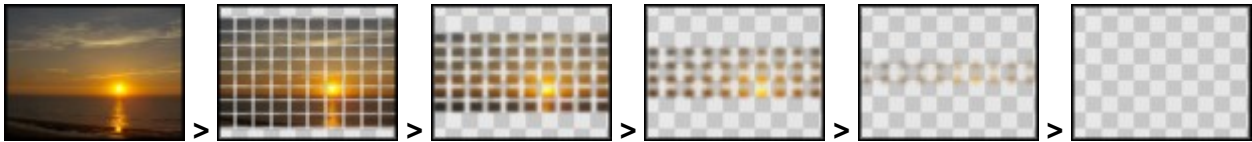
Increasing the transition possibilities by using the FX-stack

You can easily create new transitions possibilities by using multiple effects in a same FX-stack.

For example, using the *Classic Transition* effect with the *Rotary Transition* effect in the same stack can give this result :



Below, the *Classic Transition*, the *Blind Transition* and the *Gaussian Blur* effects were used in the same stack :



Of course, we can't show you here all the possible combinations because they are too much ...

But we guess you will certainly try some of them.

Lesson 11

The effects of the *Color* and *Keying* groups

In this lesson you will learn to:

- Touch up the colors of a video sequence or an animation.
- Handle the effects of the *Keying* group.

Unless indicated otherwise, all images in this lesson have only one layer.

Color channels

Based on the additive color principle, all colors are a mixture of red, green and blue (more or less dark) in exact proportions.



The color of a pixel therefore has a darker or lighter *Red* component, a darker or lighter *Green* component, a darker or lighter *Blue* component and a last component which indicates the pixel transparency level.

This last component is referred to as *Alpha* component.

TVPaint Animation Pro enables the independent modification of each of the components described above, for all pixels on the screen.



Click on the icon shown opposite in the *Tool bar* to modify only the red component of the pixels :

The blue and green pixels are not affected by your work.

The yellow and purple pixels, which are partly composed of red, are partially affected.

This is what we refer to as Enabling the *Red* channel of the image.

You may proceed in the same way to enable the *Green* and *Blue* channels.

The left icon is the toggle to enable the Alpha channel. When it is enabled all pixels are locked in their current opacity, while the other channels can still be changed for these pixels, this makes it an ideal tool for recoloring the lines of a drawing.

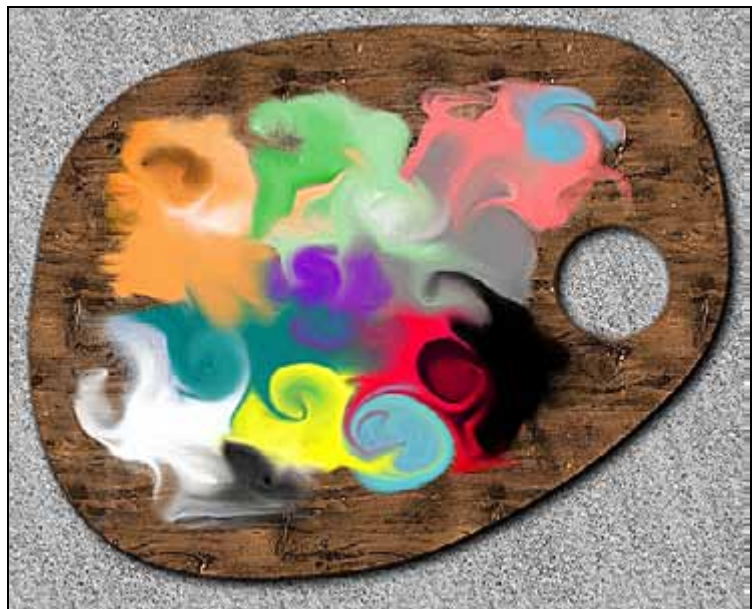
The effects in the Color menu

Let's take a look at the image opposite: the various colors were spread and mixed on a wooden palette.

All colors of the chromatic circle are present on this palette (red, orange, yellow, green, blue, purple).

This image will allow us to study all the color modifications available in TVPaint Animation Pro.

To do this, load the project « palette ».

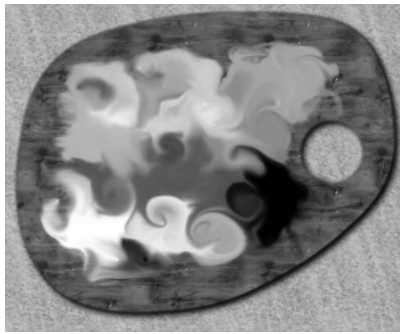


The Color > Black & White converter effect

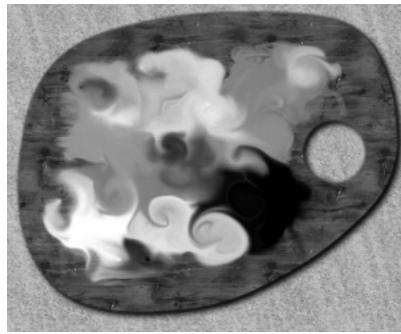
The *Black & White Converter* effect has three parameters that may be locked using an animation key. By default, it transforms the images by deleting the color data. We therefore obtain the same effect as photos taken with a black and white film.

Increasing the value of the *Red* parameter will make the red pixels of the original image lighter when changing over to gray. Reducing the value will make them darker (see next page).

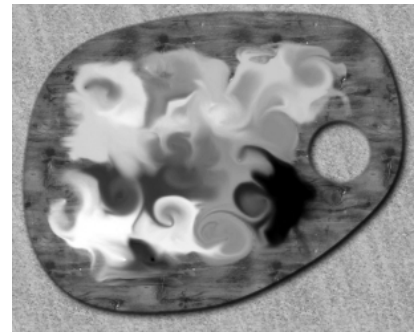
The same principle applies to the *Green* and *Blue* parameters.



Default settings

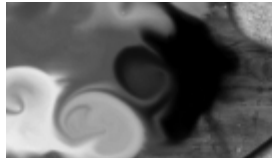


Parameter Red at value 0



Parameter Red at value 255

Below, a zoom on the red area of the image :



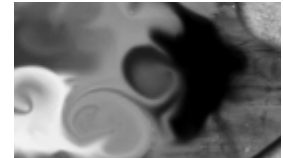
Default settings



Parameter Red (value 0)



Original image



Parameter Red (value 255)

The *Color > Color Adjust* effect



We'll keep the image from the beginning of this chapter and study the *Color Adjust* effect shown opposite in detail.

This effect uses the traditional notions of color modification for drawing and photo touch-up software packages:

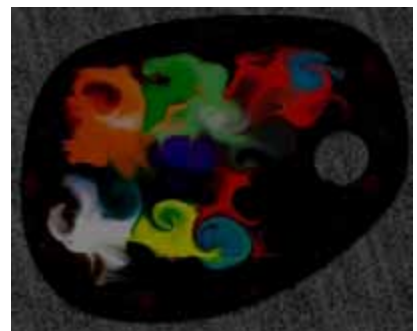
* The *Brightness* parameter is used to increase or decrease the global brightness of the current image or video (use negative values to decrease lighting). In other words, all the pixels present are either changed over to the black color or the white color.



Brightness + 75%



Original image



Brightness - 75%

* The *Contrast* parameter, if increased, will accentuate the luminosity differences between the light and dark areas. When decreased, it will reduce them.

A setting close to 100% will only make the primary colors appear, as well as black and white. A setting close to -100% will make the image or footage almost entirely gray.



Contrast + 75%



Original image



Contrast - 75%

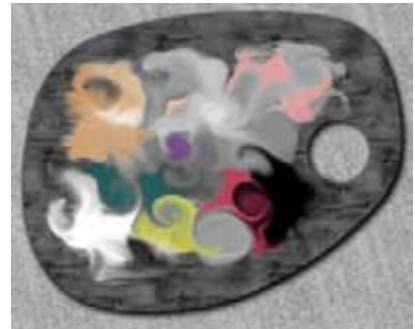
* The *Saturation* parameter accentuates or reduces color vivacity. A setting close to 100% will reduce the number of pixels close to the gray colors while reviving the colors, a setting close to -100% will produce a gray drawing.



Saturation + 75%



Original image



Saturation - 75%

* The *Gamma* setting is often used for photo touch-up but also enables lightening or darkening an image without leaving the impression that a dark or light sheen was placed over it. Its value may vary between 0.01 and 5.



Gamma = 2



Original image (Gamma =1)



Gamma = 0.5



At first sight, the *Gamma* parameter seems to have the same effects as the *Brightness* parameter. This is true, with the difference that the *Brightness* parameter affects all pixels on the screen whereas the *Gamma* parameter affects the light and dark pixels only marginally.

Below you will find an example of the difference between a gamma reduction and a reduction of the brightness :

Reducing the *Gamma* by half only slightly affects the pixels making up the paint and the background: the latter remain bright and clear.

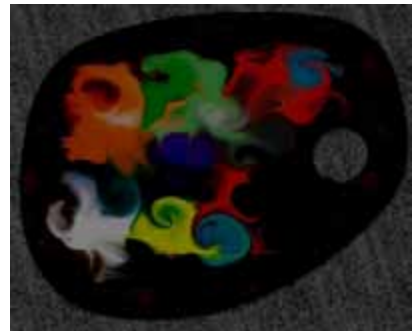
Modifying the *Luminosity* to -50% gives the same pixels a darker hue.



Original image (Gamma = 1)



Gamma = 0.5



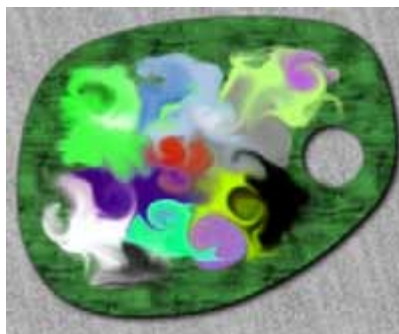
Luminosity - 50%

* The *Angle* parameter enables rotation of colors at the angle of your choice around the color wheel (see below).

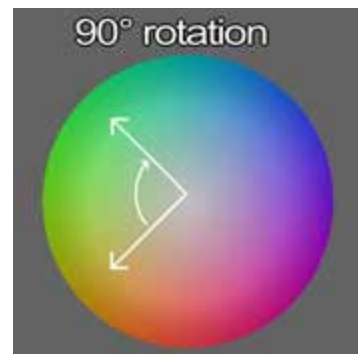
For example: going from angle 0° to the angle 90° will transform the orange colors in the image to green, blue to purple,...etc.



Original image



Rotation of colors of 90°



The color wheel

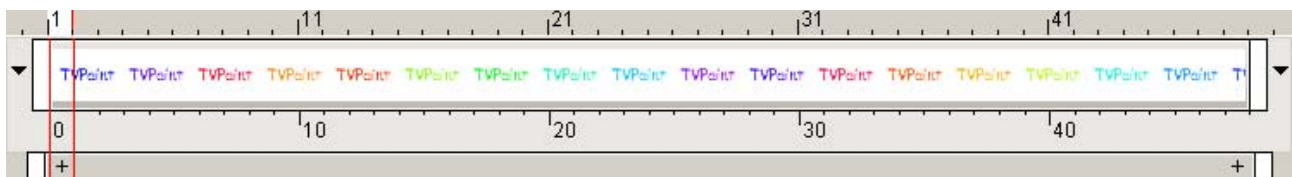
* The *Rotation* parameter reflects the number of turns around the color wheel before arriving at the chosen angle. This allows you to make the colors vary in a time cycle, which is sometimes useful for colored logos.

In the example below, we start with a blue TVPaint logo (R=0, G=0, B=255), placed on each image of an animation layer comprising forty-eight.

TVPaint

An animation key is placed at the first image of the layer, locking the value « 0 » for the *Rotation* parameter. A second key is placed at the last image of the layer, locking the value « 2 » for the *Rotation* parameter.

When the FX stack is applied, you see the following result:



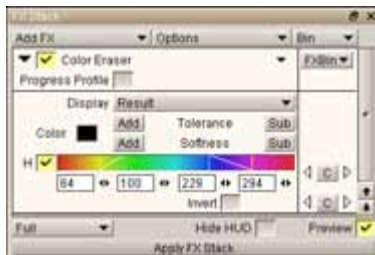
The logo changes color in cycles, going twice in a row through the colors of the color wheel.

The Color > Color eraser effect

Let's assume that we want to delete the green and blue colors in our image. This is easily done using the *Color eraser* effect.



By erasing the color we understand erasing the data relative to the color composing the pixels and not modifying the opacity of the pixels. In other words, we unsaturate the pixels with a precise hue.



Original image



Image with green and blue hues erased

Start by selecting a color in the green area of the image in the *Color* box of the panel above. Part of the green pixels will then be unsaturated and turn to gray. To obtain a better finish, you may increase or decrease the tolerance or softness thresholds.

To select the pixels according to their hues, the color bar of the panel as well as the 4 mini-sliders will help you.



non-unsaturated hues,



progressively unsaturated hues,

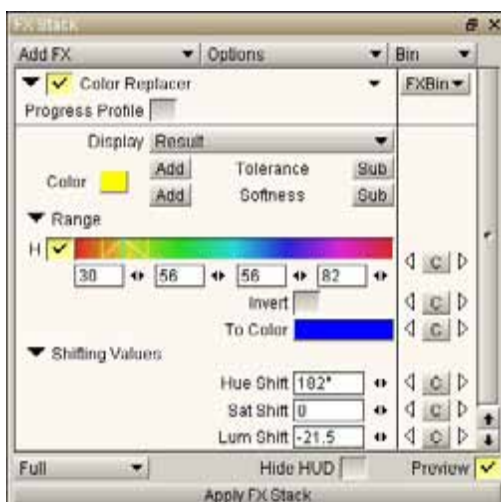


completely unsaturated hues,



The *Invert* button is used to invert the final result: saturated pixels become unsaturated and vice-versa. If necessary, the popup menu *Display* enables recovery of source image viewing.

The Color > Color Replacer effect



The *Color Replacer* effect is based on the same principle as the effect *Color Eraser*, with the difference that you do not unsaturate the colors.

Indeed, using *Shifting values* enables progressive modification of the hue, saturation and luminosity of the chosen color range. You may thus easily toggle one color range to another.

The *Shifting values* are calculated as being « gap » in the H.S.L system between the two colors of the panel (blue and yellow in this example).



Original image



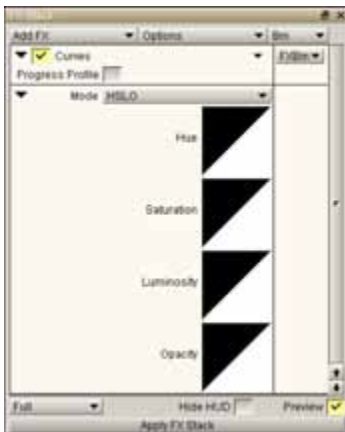
Yellow colors changed to blue

The *Color > Curves* effect

Each pixel on the screen is defined by its components:

- * The so-called *R.G.B.A* generates the color of a pixel with four components: red, green, blue and alpha. In this system, the values of the four components vary between 0 and 255.
- * The *H.S.L.O* system generates the color of a pixel using four other components: hue, saturation, luminosity, opacity. In this system, the values of saturation and luminosity may vary between 0 and 255, the hue may have a value between 0 and 359 (thus the previously used concepts of angle and color wheel).

Inversely, any pixel on the screen may be broken down in each of the two coordinate systems. Modifying the color of a pixel therefore means you modify the values of its components.



The *Curves* effect enables precise management of these modifications: the *Mode* popup menu offers a choice between the two systems described above.

Let's go, for example, into the *H.S.L.O* system and take a look at our image. Next to the name of each component we find a miniature profile, comparable to those we encountered when studying the drawing tools and acceleration of an effect.

Click on the luminosity miniature profile to call up the edit profile window.



The options proposed are traditional: flip the curve along the « X » or « Y » axes, use pre-defined curves, save the settings, modify interpolation of the points...

Now we just have to study the meaning of the curve:

- * The horizontal axis represents all luminosity values that may be contained in a pixel on the screen (values between 0 and 255)
- * The vertical axis (also known as *LUT*: Look Up Table) represents all luminosity values of the pixels once the *Curve* effect has been applied.

Let's take the curves below as examples:



* In this example: the luminosity of every pixel is divided by two after application of the effect (for example, a luminosity value of 50 changes to 25 after application of the effect).

* In this example, the luminosity of every pixel remains unchanged.

* In this last example, any pixel with a luminosity value between approximately 64 and 192 will turn black, the others remain unchanged.

We have just studied the luminosity curve in detail. Now it's up to you to work with the other curves and use them to the advantage of your projects.

The **Color > Histogram** effect

We have just seen that it is possible to work on pixels using curves.

TVPaint Animation Pro also offers the possibility to work on the colors on a more «statistic level» thanks to the *Histogram* effect.

The first function of the histogram is to provide information about the distribution of colors on the screen.

Let's take for example the images below and select the *Master* tab in the first row of tabs and *Luminosity* in the second. We will obtain the following graphs :



The *Log* box enables use of a logarithmic scale instead of a proportional scale. For the moment, pay attention that this box is not checked ...

* The more dark pixels the image on the screen contains, the more dense the graph is to the left (this is the case for our red planet).

* The more light pixels the image on the screen contains, the more the graph is concentrated on the right (this is the case for the image of the tree).

For a luminosity value given in the abscissa, the graph proportionally represents the quantity of pixels of the image having this luminosity value on the ordinates axis.

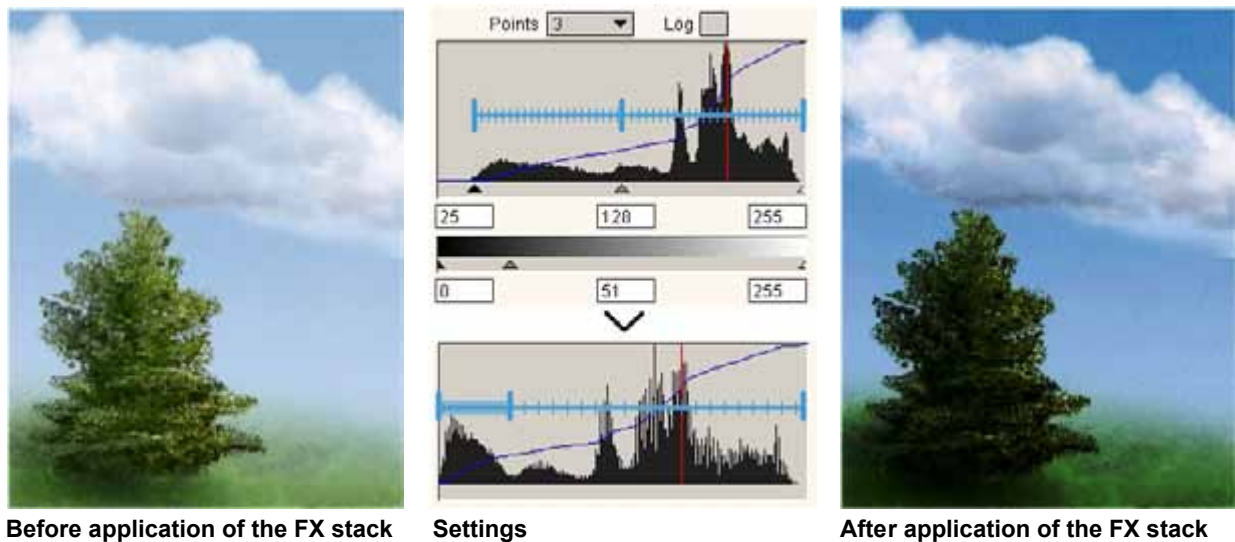
The blue curve represents the percentage of pixels having at least attained the luminosity value in the abscissa, the vertical red line represents the pixels the luminosity of which is the most represented on the screen.



The tabs *Red*, *Green*, *Blue* and *Alpha* work according to the same principle and image analysis is reduced to the channels of the corresponding colors.

The second function of the histogram, as you may have guessed already, is to modify the color properties of the image or video of the current layer (here again, the animation keys lock the parameters for a given position in the timeline).

To do this, we have to use the slider system of the histogram. You may use two, three or four of them. The latter enable re-calibration of the histogram by stretching or contracting it. Let's again take a look at the pixel luminosity component. Below, you see the example of luminosity modification using the three sliders:



The section of the histogram between the abscissas 25 and 128 will be contracted to fit between the abscissas 0 and 51. The section of the histogram between 129 and 255 will be stretched to fit between abscissas 52 and 255.

This means that the dark components of the pixels in the image will be reinforced and contracted whereas the light components of the pixels in the image will be redistributed, spread and therefore reduced.



The tabs *Red*, *Green*, *Blue* and *Alpha* make the other graphs relative to the current image appear. Each of them may be modified independently of the others.

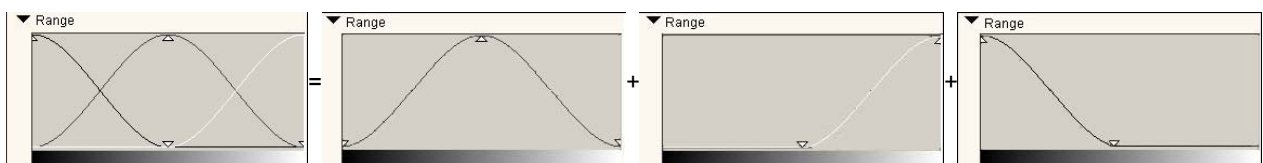


The principle of contracting and stretching is the same, regardless of how many sliders are used. Only the number of contracted or stretched intervals changes..

The first row of tabs contains four tabs: *Master*, *Shadows*, *MidTones* and *HighLights*.

- * Clicking the *Shadows* tab limits the impact of the slider modifications to the dark colors, gradually.
- * Clicking the *MidTones* tab limits the impact of the modifications to the medium tones and will reduce them progressively and finally cancel them out for the dark and light colors.
- * Clicking the *HighLights* tab limits the effects of the histogram modifications to light tones, the latter waning progressively then cancelling out for the medium and dark tones.
- * The *Master* tab affects all color ranges in the same way.

Look at the following graphs for a better understanding:

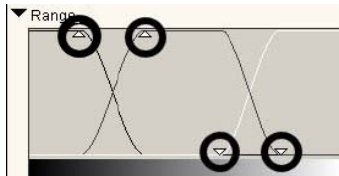


Three curves are represented:

- * The black curve represents the impact of the modifications in the histogram on the dark tones (*Shadows* tab)
- * The gray curve represents the impact of the modifications on the medium tones (*MidTones* tab)
- * The white curve represents the impact of the modifications on the light tones (*HighLights* tab)

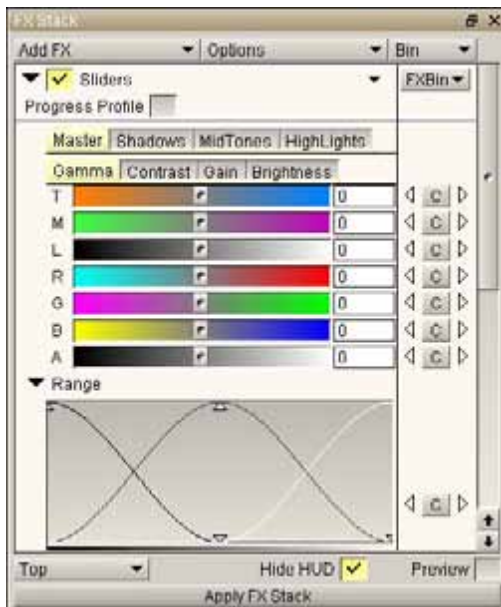
The tones concerned are located on the abscissa.

The impact power is represented on the ordinates axis (the higher the curve for a given range, the higher the influence of the histogram modification on this range).



The circled sliders in the graph opposite are used to move, contract or stretch the three curves and, consequently, modify the effect of the tabs.

The Color > Sliders effect



In addition to the effects affecting the color on a « geometric » and « statistic » level, there is a last color correction effect which is more complete and is applied using sliders (as the name implies ...).

* It also has four tabs: *Master*, *Shadows*, *MidTones* and *HighLights* which have the same task as those in the Histogram tool: used to choose whether you wish to work on lighter or darker color ranges.

* The following four tabs: *Gamma*, *Contrast*, *Gain*, *Brightness* control how the LUT curves will be modified when a slider is moved.

* The seven lines correspond to seven *LUT* curves (see above) which may be modified: *Temperature*, *Magenta*, *Luminosity*, *Red*, *Green*, *Blue* and *Alpha*.

When the *Gamma* tab is selected, moving the slider to the right increases the height of the L.U.T curve (and therefore increases the values of *Temperature*, *Magenta*, *Red*, *Green*, ...) for the range selected (*Shadows*, *MidTones*, *HighLights*). The ends of the curve are less affected by the slider modifications (the modifications take place progressively).

When the *Contrast* tab is selected, moving the slider to the right increases the height of the L.U.T curve in its high sections and decreases the curve in its low sections for the chosen range. This means that the strong values of (*Temperature*, *Magenta*, *Red*, ...) will be reinforced and the weak values reduced for the range of your choice (moving the slider to the left produces the opposite effect).

The *Gain* tab functions in roughly the same way as the *Contrast* tab, but the ends of the curve are gradually less affected by the slider modifications (the modifications of the values of *Temperature*, *Magenta*, *Red*, ... are the same as with the tab *Contrast* but work in a more subtle and progressive manner).

The effects of the *Brightness* tab are similar to the *Gamma* tab but the modifications are not applied in a progressive fashion due to the identical attribution from one end of the curve to the other.

The **Color > Scan Cleaner** effect

This effect is used to clean up a scanned image drawn by hand.

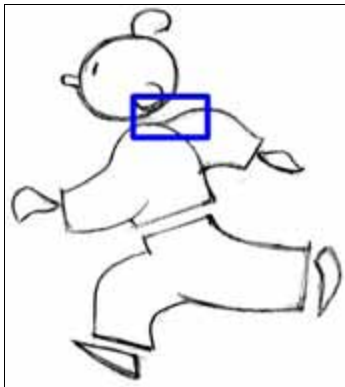
Let's take a look at the sketch below to the left. This effect will not only make the light pixels of the image transparent and color the remaining pixels black (1) but will also remove unwanted pencil marks (2)



>>



(1)

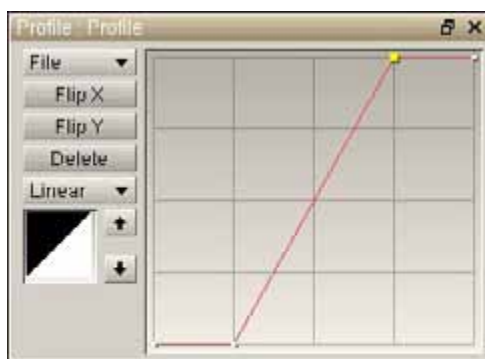


>>



(2)

The diagram below illustrates the role of the profile curve present in this effect :



— ink
(high opacity
after application of the effect)

— paper sheet
(low opacity
after application of the effect)

The **Colors > Image Source** effect



It is necessary to know a few effects of the *Stylize* group (like *Drop Shadow*, *Add Border* or *Lumix*, ...) in order to master the *Image Source* effect perfectly. So it will be studied at the end of lesson 12.

The effects of the *Keying* menu

The *Keying* menu contains all effects which are used to make a color on the screen transparent. These effects are sometimes called cut-out and incrustation effects.

The *Keying* > *Luma Keyer* effect

The *Luma Keyer* effect is used to render pixels transparent according to their luminosity. When you have scanned an image on a white background you obtain a completely opaque layer. With the *Luma Keyer* effect it is therefore possible to make the white pixels of this image transparent:



Let's take a look at the drawing on real paper above. Application of the *Luma Keyer* effect set with correct parameters will render the light pixels transparent (independent of their hue and saturation), progressively increase the opacity of the medium tone pixels and leave the dark pixels intact. This gives us the image shown to the right.

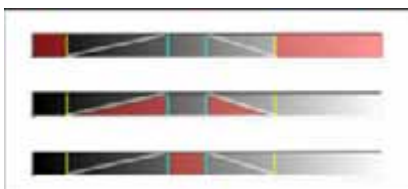


At this point, it is possible to re-color the image, if desired : simply place a layer under the image obtained and spread the colors of your choice on it (see example opposite).

You may also use the shape floodfill tools studied in lesson 6.

These are the functions of the *Keying* > *Luma Keyer* effect:

- * The *Display* popup menu is used to choose between viewing the source image and viewing the result.
- * The color box is used to choose the color the luminosity of which you wish to render transparent directly on the screen.
- * The buttons + and – are used to adjust the tolerance and softness of pixel cut-out.
- * The mini-sliders allow adjustment of the following, depending on the luminosity and with the help of the diagram below:



The type of pixels which remain opaque

Those which are progressively made transparent

Those which will be completely transparent



It is recommended to combine the *Luma Keyer* effect in a multiple FX stack with the *Colors* > *Histogram* or the *Colors* > *Slider* effects to be able to precisely adjust pixel transparency (use the parameters relative to the alpha component) and remove the gray aspect (light) of semi-transparent pixels.



The effects *Keying > Luma Keyer* and *Colors > Scan Cleaner* change the opacity of the pixels differently : the *Luma Keyer* doesn't remove the unwanted pencil marks. The *Scan Cleaner* change the color of the pixels, and the *Luma Keyer* doesn't.

The *Keying > Color Keyer* effect



The *Color Keyer* effect uses the same principle as the *Luma Keyer* effect. It deletes the selected color on the image or video footage of your choice.

It is no longer required to concentrate on pixel luminosity but on the entire color.

Two types of parameters may be locked with a key: *Tolerance* and *Smooth*.

In the FX stack above we see: the higher the value of the *Tolerance* parameter, the more colors close to « blue » will be deleted.

The higher the value of the *Smooth* parameter, the less abrupt the transition between opaque and transparent pixels will be.



Opposite, most of the bluish colors of the sky and cloud become transparent.

The green and dark colors of the tree are further away from blue and therefore opaque.



These two keying effects may, of course, be applied to a complete footage, which makes work easier when using a scanner with loader or a recorded video sequence.

Let's take another concrete situation :



The character nearby was shot on front of a blue screen. We are going to explain how to remove this blue background and to replace it by another background.

It's a technique often used for animation : weather reports are shot with a single-colored background which is removed and replaced by a weather chart.

Let's go back to our character : the purpose is to make transparent all the blue pixels and to display a new background on another layer. To do so, let's load a *landscape* background nearby and put it as an Animation layer, under the layer containing the character.



The blue color is called *key color* (that's why the effect is called keying).

You should have a timeline looking like this :



Now select the *Color Keyer* effect in the FX Stack. Choose a blue pixel from the background and adjust the *tolerance* and *softness* parameters.

Apply the effect to the whole image sequence, and here it goes, the blue background has disappeared and is replaced by the landscape.

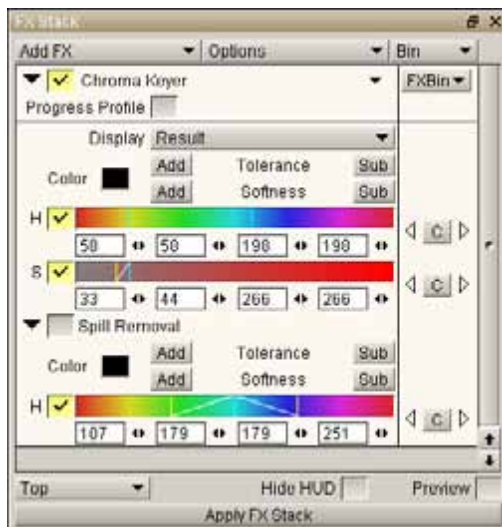
The same method is also used to create a weather report (see below)



There are other keying effects, more complex, which have to be used in some specific situations.

The Keying > Chroma Keyer effect

The *Keying > Chroma Keyer* effect is used to make pixel transparent depending on their tint and saturation.



The panel and the buttons of this effect look very similar to the ones of the effect *Color > Color Eraser*. That's why we will not explain each parameters in details...

Let's take for example the video sequence above with orange and red flowers. The background of this sequence is a blue-gray shutter (more or less dark blue-gray tints).

If you use the *Keying > Color Keyer* effect by selecting one of the dark shutter colors, it will not remove all the shutter pixels but it will remove some pixels of the flower's stalk too. (see below (1))

If you use the *Keying > Color Keyer* effect by selecting one of the light shutter colors, it will remove all the pixels of the shutter but it will remove the light pixels of the flower's too. (see below (2))



(1)



(2)

The results above, obtained after the use of the *Keying > Color Keyer* effect, are imperfect.

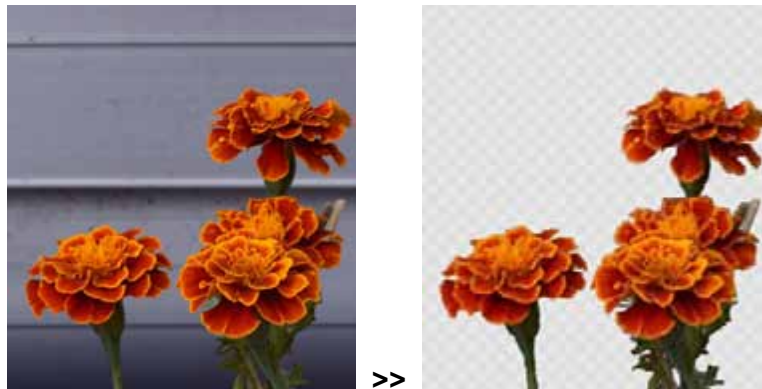
The *Keying > Chroma Keyer* effect will help us to obtain better results.



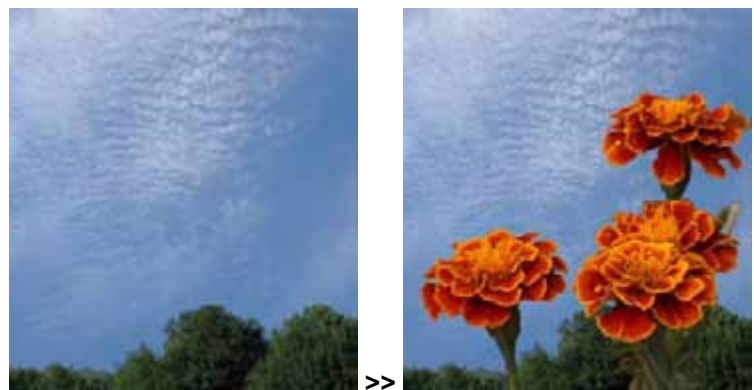
* The Tint parameter bar will make transparent the blue pixels in a wide range : light blue or dark blue will not change the result. The orange-red pixels of the flowers and the green pixels of the stalk will stay unchanged.



* The Saturation parameter bar permits to make green pixels more or less transparent depending on their saturation. As a consequence, we will be able to make transparent all the blue-gray pixels. Here is the result : we finally succeed to keep the the pixels of the flowers visible and made the pixels of the shutter transparent.



To finish our work, we can easily add a landscape on a layer and put it behind the flowers layer. (see the timeline below)



Let's go back to our blue-screened character :

Although we used the *Keying > Color Keyer* effect with the our blue-screened character in the last chapter, you certainly guess that it is also possible to use the *Keying > Chroma Keyer* effect.

When characters are shot with blue screen, there are sometimes some undesired light effects, especially little blue reflections colorizing some part of the image (see image below on the left).

It is of course possible to remove the blue tint to these pixels by making them grey. That's the function of sliders and buttons from the *Spill Removal* section of the panel.

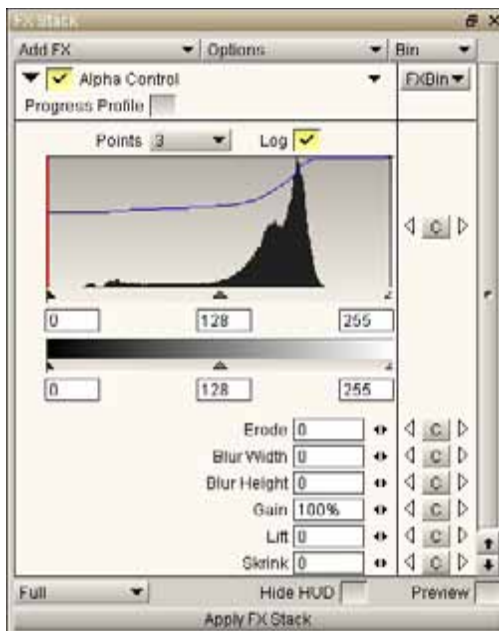


The *Keying > Alpha Control* effect

Let's take back the example of our flowers. The *Keying > Chroma Keyer* has been already applied and the landscape background is visible behind the flowers. If you look at it in detail, you will see

that some imperfections remain : a black borderline, more or less visible, is still remaining, small lines or points are not fully transparent and stand out from white clouds.

The *Alpha Control* effect can fix these errors.



Here is how the effect appears in the FX Stack :

* You can first notice the presence of a histogram, a tool you are now familiar with. This one represents the quantity of pixels displayed on screen depending on their luma (in percentage).

* In the bottom of the panel, there are some numeric fields and mini-sliders at your disposal :

The *Shrink* parameter can trim the opaque pixels of the image. That is the best to remove the black borders around the flowers.

The *Erode* parameter erase progressively the opaque pixels of the image by starting from its borders. It permits to soften the transition between transparent pixels and opaque ones, and even to improve the superimposition effect.

Both *Blur* parameters can reduce and soften the shapes borders between opaque pixels and transparent ones.

The *Gain* parameter permits to turn opaque and to darken pixels which are almost transparent. This is very useful to stand out the little imperfections, especially the ones that have not been fully removed when using some *Keying* effects.

On the opposite, the *Lift* parameter can turn opaque the pixels which are almost transparent.



Use of the *Erode* parameter



Use of the *Shrink* parameter



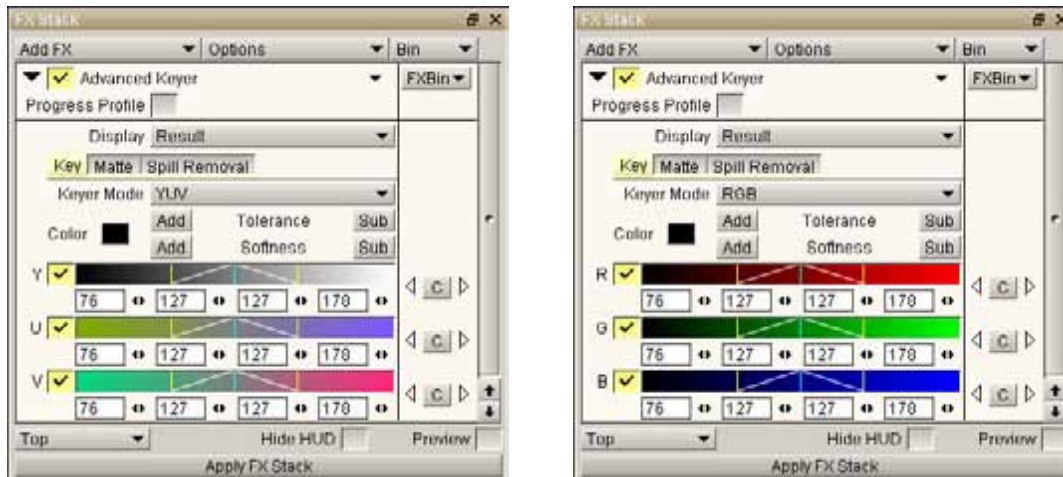
Use of the *Gain* parameter set to 1000%

The Keying > Advanced Keyer effect

The *Advanced Keyer* is the most complex and the most powerful *Keying* tool in TVPaint Animation Pro. Experienced users often use it for very accurate keyings.

We have already seen that each color can be broken up in various ways depending on the color system (RGBA, HSLO, YUV) while each system defines *color channels*. (the YUV system is used by the NTSC and PAL video formats)

The *Advanced Keyer* effect permits to cut-out on each color channel which allows you to do very accurate keyings. (see below)



* The *Key* tab lets you adjust the keyer in the different color systems.

* The *Matte* tab has the same function as the previously described *Keying > Alpha Control* effect so you can just adjust the cutout process better.

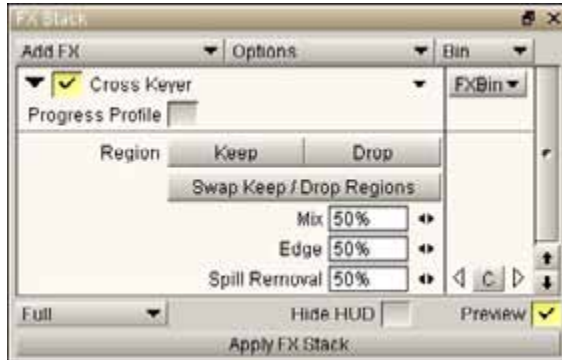
* Finally, the *Spill Removal* tab is also available and works the same as the *Keying > Chroma Keyer* one.



Working with the *Hue* and *Saturation* component of the HSLO system is the same than working with the *Keying > Chroma Keyer* effect.

Working with the *Luma* component of the HSLO system is the same as working with the *Keying > Luma Keyer* effect.

The Keying > Cross Keyer effect



The *Keying > Cross Keyer* effect works in a different way than the other keying effects : It doesn't require to select a range of colors in a color system like RGB, TSL, YUV, etc ... In this effect, you only need to define a first region whose colors will be kept, and another region whose colors will become transparent.

Selecting those two regions can be easily done thanks to the two dedicated *Region* buttons :

- * To select the colors you want to keep after applying the FX, just use the left mouse button on the *Keep* button. After this you will be able to select an area directly on the HUD. (your cursor will be changed into a lasso)
- * To select the colors which will become transparent, you can use the same method with the *Drop* button.



When selecting a new area on the HUD :

- * Use the left mouse button to add it to the previously selected area.
- * Use the right mouse button to subtract it from the previously selected area.

To visualize the render of this effect, use the right mouse button on the current activated button (*Keep* or *Drop*). Of course, the result depends on the two areas you have just selected.

In the example below :

On the left image : there are two areas located on the sky and on the pathway. They indicate the colors (red and cyan) that will be kept on the whole picture.

On the right image : there is one area located on the grass and on the trees. It indicates the colors (orange and green) that will be dropped.

The picture in the right shows the result after applying the effect :



Keep region



Drop region

>



Final result



* The *swap keep and drop regions* button allows to swap the *Keep* and *Drop* regions.

It is then possible to obtain the opposite result.

* The *Mix* parameter allows to extend or restrict the number of colors located in the transparent area of the resulting image.



Mix = 0%



Mix = 50%



Mix = 100%

* The *Edge* parameter allows to adjust the mixing level between the transparent and opaque pixels.

The lower the value will be, the less the two regions will differentiate. The higher the value will be, the sharper the edges will appear.



Edge = 0%



Edge = 50%



Edge = 100%

* The *Spill Removal* parameter has the same function as the *Spill Removal* parameters encountered in the effect *Keying > Chroma Keyer* : it unsaturates the undesired light reflections. In the example below, we zoomed on the frontier between the grass and the pathway.



Source Image



Spill Removal = 0%



Spill Removal = 100%

Lesson 12

The effects of the *Stylize* group

In this lesson, you will :

- Discover some effects of the *Stylize* group dedicated to the animation.
- Discover some effects of the *Stylize* group dedicated to the video-editing.

Introduction

The effects of the *Stylize* menu are often used to work on logos, drawings or video footages. We will take the images below as reference images for our examples:



TVPaint



The running kid and the TVPaint logo are located over different background layers.

The *Stylize* > *Glow* effect

It is possible to create an aura around a text or any other image containing transparent pixels ... The *Width*, *Height*, *Color* and *Opacity* of this aura may change in time thanks to the key system.

TVPaint TVPaint TVPaint

The *Stylize* > *Grain* effect

This effect adds a noise (polychromatic or monochromatic) to the image or video footage of your choice. The *Size* parameter is used to set the size of the grains, the *Range* parameter controls their distance.

It is also possible to adjust their color using the parameters *Red Variation*, *Green Variation* and *Blue Variation* as well as modify their transparency.

If a logo is placed in front of a filmed sequence, application of a light noise on the logo helps integrate it into the sequence and minimize the « computer » look of the latter. The noise effect may also be used to smudge an image or drawing in a different way than a blur effect.



Original image



Monochromatic noise



Polychromatic noise

TVPaint TVPaint TVPaint

Original image

Blue polychromatic noise

Noise with larger grain size

The Stylize > Bevel effect

This effect is used to give volume to your logos or drawings.

The *Mode* popup menu is used to choose between creation of an inner or outer relief. You may also use both effects at the same time, which gives a relief effect to the contours of your image.

To give an image relief you must set the *Size* of the bevel as well as its *Lighting* using the following parameters: *Force*, *Altitude*, *Direction*, *Color* and *Power*.

The *Smooth* parameter enables attenuation of rough contours by applying a slight blur.

TVPaint TVPaint TVPaint

Inner bevel

Outer bevel

Inner and Outer bevel



Inner bevel



Outer bevel



Inner and Outer Bevel

The Stylize > Drop shadow effect

This effect is useful to add a shadow to a logo or any other image that is not entirely opaque.

Color, *Direction*, *Distance* and *Opacity* are parameters that may be set using keys at your disposal. In this way you can make the shadow of your logo move as if a light source were moving above it.

TVPaint TVPaint TVPaint

various shadow distances and directions



Traditional shadow and blurred shadow
(the background and the running kid are located on different layers)



The *Shadow only* option of the *Toonshading* and *Drop Shadow* effects will be studied later in the chapter called « the *Color > Image Source* effect »

The Stylize > Toon Shading effect

This effect differs from the drop shadow as it enables creation of a shadow inside an image. The transparent pixels are not affected by the creation of your shadow (see below).

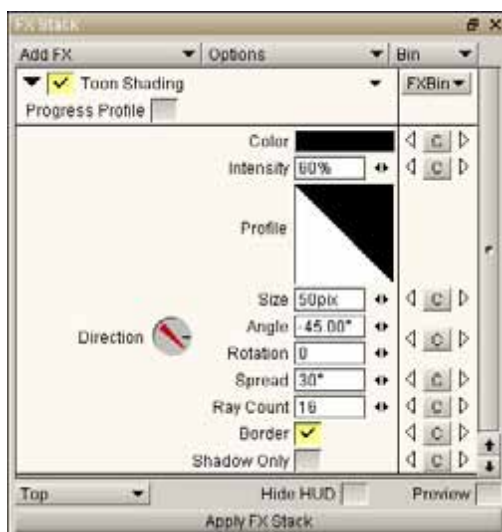


Toon Shading



Drop shadow

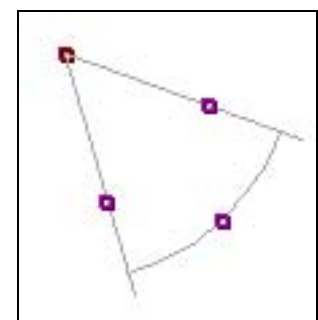
Let's take the shape filled with white below as an example to study this effect:



The panel of the toon-shading effect

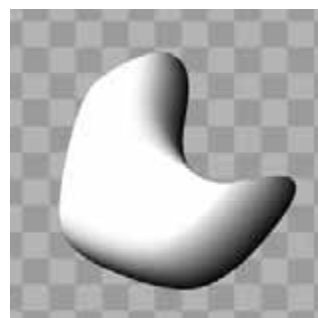


Our reference image

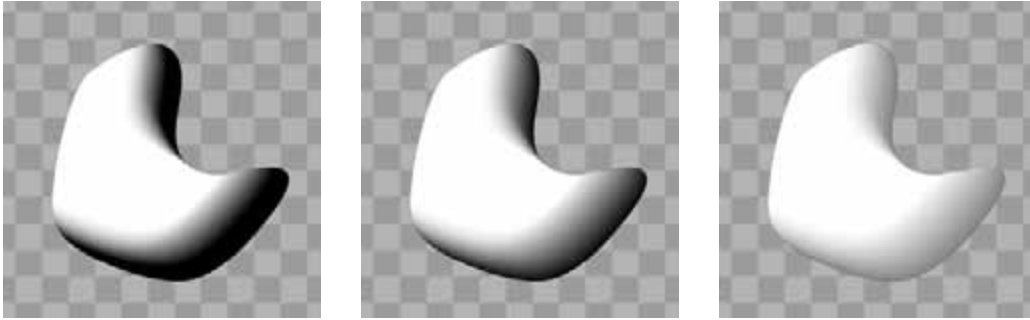


The HUD of the effect

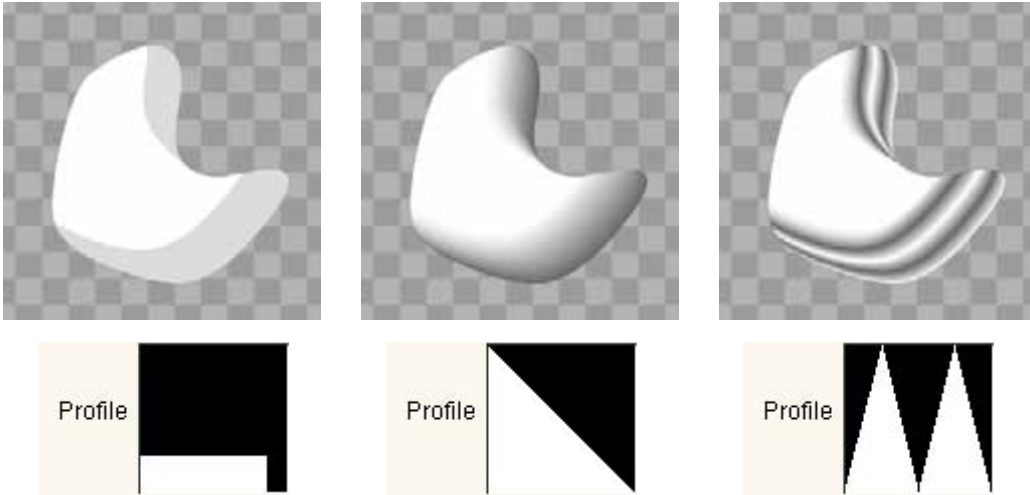
- The *Color* box is used to choose the color of the shadow you will create.



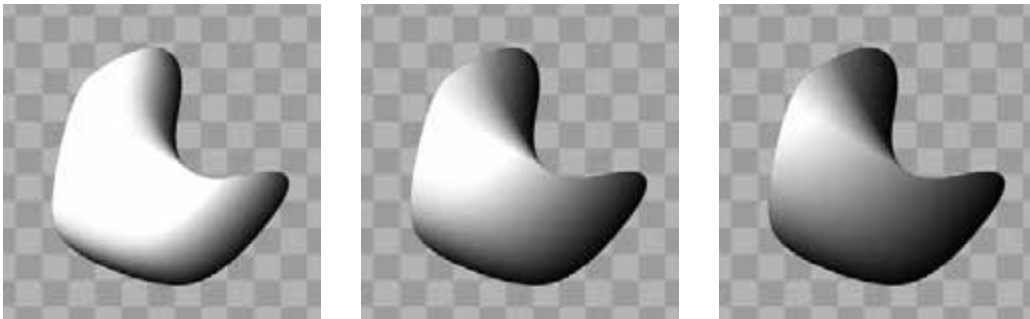
- The *Intensity* option is used to vary the power of the shadow in time:



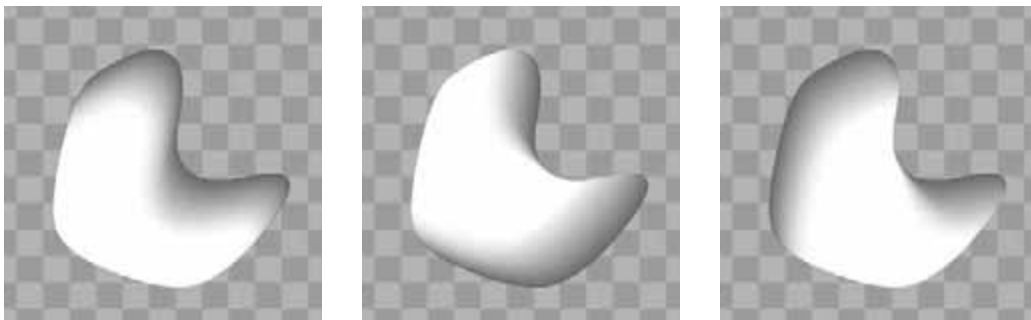
- The *Profile* option is used to vary the nature of the shadow:



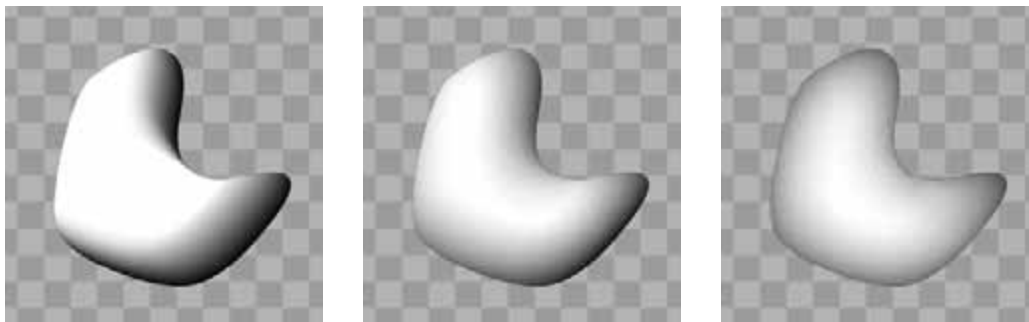
- The *Size* in pixels sets the range of the shadow:



- The *Angle* parameter is used to choose the direction of your lighting/shadow. When using animation keys, the *Rotation* parameter reflects the number of complete rotations to be carried out before arriving at the chosen angle.

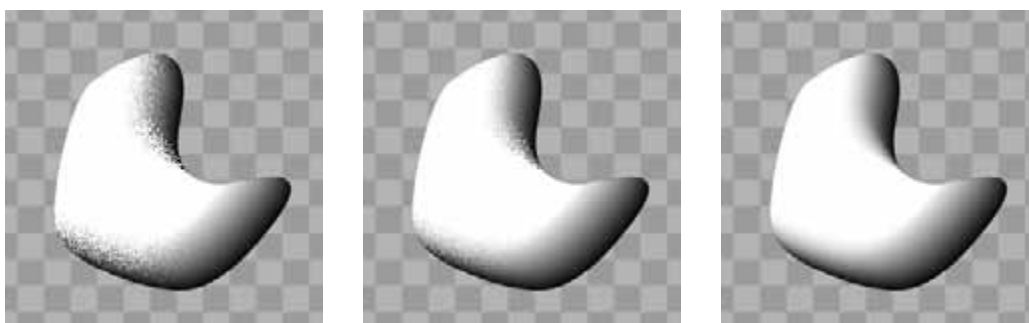


- The *Spread* parameter (in degrees) defines the angle over which the shadow will be spread (see next page).



Using the *HUD* is very practical to adjust the angle, size and spread of your shadow.

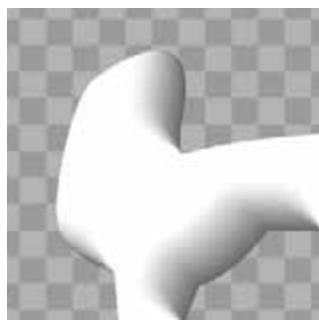
- The *Ray Count* parameter refines the result when applying the effect. The higher this value, the higher the quality of your image, the lower the value, the more noise your shadow will contain.



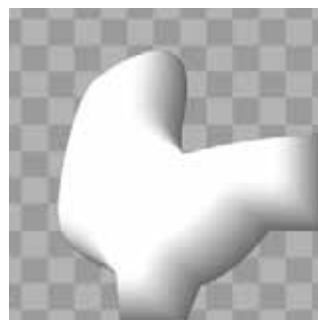
- The *Border* box, if checked, is used to create a shadow from the borders of your project (see below).



Original image



Border option not enabled



Border option enabled

Once you know how to use the Toon-shading effect, it is possible to create all kinds of shadows for your characters:



The *Shadow only* option of the *Toonshading* and *Drop Shadow* effects will be studied later in the chapter called « the *Color > Image Source* effect »

The Stylize > Erode effect

This effect enables eroding the contours of an image or video footage.

This may create an interesting effect for the appearance or disappearance of images as well as for the attenuation of contours (see below...). There are two parameters that may be adjusted using keys : *Width* and *Height*.

TVPaint TVPaint TVPaint TVPaint



The Stylize > Add Border effect

This effect is in a way the opposite of the *Erode* effect. It enables creation of a border of the thickness of your choice around an image. As TVPaint Animation Pro works with sub-pixel precision, it is possible to increment this thickness in steps of 0.5 pixel using the associated mini-slider.

It is also possible to choose the color of the border.

TVPaint TVPaint TVPaint



Here again, the option *Border only* will be studied later in the chapter called « the *Color > Image Source* effect »

The Stylize > Bloom effect



This effect produces a light blurred aura on the current image and may give an unreal aspect to an animated footage. Contrary to the *Glow* effect this bloom is applied to the opaque areas of the image.

The parameters *Width* and *Height* are the same as those for the *Glow* effect.

If you wish, you may apply the bloom effect to the channel of your choice (*Red*, *Green* or *Blue*) and control *Blur*, *Saturation* and *Luminosity* of this aura.

The Stylize > *Blender* effect



This effect blends the original image in a certain way and then transforms it into a large puzzle, the pieces of which have distorted contours. The adjustable parameter enables random modification of the result.

The Stylize > *Mosaic* effect



This effect was already studied in lesson 9. It enlarges the pixels on the screen to the *Width* and *Height* of your choice.

The Stylize > *Posterize* effect



This effect is used to reduce the number of colors on the screen and simplifies the original image or video footage. The *Number of colors* parameter may be set using the mini-slider and locked with a key.



This *Number of colors* parameter does not represent the exact number of colors on the screen but the number of colors blended to obtain the effect required.

The Stylize > Noise effect



This effect moves the pixels of the original image at a distance corresponding to your parameter setting.

You may also choose the percentage of pixels of the original image to be moved.

Well applied, this effect gives the impression that one sees the image or video footage through frosted glass.

The Stylize > Print effect



Have you ever looked at a comic or cartoon strip through a magnifying glass? The color areas are made up of superposed round points of different sizes and colors.

The *Print* effect reproduces exactly this aspect.

You may choose to work in *Color*, in *Black & White* or work only on the non-opaque areas of the image...



The *Size* parameter is used to set the size (and therefore the number) of dots on the screen. Opposite and on the page above you see the *print* effect applied with the *Color* channel and with the *Black & White* channel.

The Stylize > Negative effect



This effect replaces the color of each pixel with its negative.

The Stylize > Solarize effect



This effect reproduces the photographic effect named solarization which consists of mixing the colors of an image with the colors of its negative.



These two effects have no parameters.

The Stylize > Color Range effect



This effect substitutes the colors of one of the channels *Red*, *Green*, *Blue*, *Alpha* or *Luminosity* with those of the gradient of your choice (see lesson 3 for gradients).

In the example above: the gradient blue > orange > yellow was applied on the image's luminosity channel:

the yellow pixels replace the light pixels of the image,
the red pixels replace the mid tone pixels,
the blue pixels replace the dark pixels.

The Stylize > HalfTone effect



The *HalfTone* effect reproduces the aspect of a « grid » on the current image and gives the current image the appearance of an « artist's canvas ».

- * You may set the parameters for the horizontal and vertical cells (*H cells* and *V cells*), *Direction*, *Opacity* of the grid as well as their type (*Line*, *Dot*, *Cross*, *Checks*, *Blocks*, etc.).
- * There are also several application modes: *Color on black*, *Color on white*, *Saturation*, etc.
- * Finally, you may use the *Jitter* parameters which will slightly modify the shape of the grid.

The Stylize > Lumix effect

This effect exchanges the luminosity values of the pixels in an image or source video footage with those of another image or footage, which gives the impression of seeing an image through the contours of another image (see below).



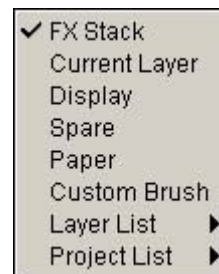


The Source Image notion

A source image or footage is used in the *Rendering* box of the *Lumix* effect and some other effects (in particular the *Motion > Keyframer* effect which will be studied later). Let's discuss this further:

TVPaint Animation Pro offers some effects which require the use of an image or footage other than the current image. These are referred to as source images or footages.

Several choices are available for the so-called source images or video footage: the project of your choice, the layer of your choice, the current brush or animated brush, the spare image, the paper, the current display, the *FX stack*.



* The choice *FX stack* will use the current image with the effects of the *FX stack* applied as *Source Image* before applying the parameters set for the *Source Image*.

* The choice *Current layer* allows you to apply the effect from the current layer.

* The choice *Display* allows you to apply on the current layer the effect from the footage viewed when playing your project (the effect will be that all layers appear to be merged, while the hidden layers are not taken into account).

* You may also choose to use the *Spare Image* or *Paper* if they are available.

* When choosing another project, layer or brush, you may adjust the Pre- and Post-Behavior, the position and the animation mode: the number « n » of the *Position* parameter corresponds to the image « n » of your project, animation layer or animated brush.

The *Animation* mode controls the « behavior » of your brush, layer or project: random animation, ping-pong, animation reduced to the image indicated in the position parameter, etc.

If the number of source images is lower than the number of images to which your effects are applied, you may adjust the Pre- and Post-Behavior for your source (random, pingpong, loop, etc.).

As required, you may choose to flip your source vertically, horizontally or both, before using this source.

The Colors > Image Source effect

The *Colors > Image Source* effect allows you to display the image or the sequence of your choice on the current layer.

* The *Source* menu use all notions encountered in the last paragraph. As a consequence, you can choose to display the current layer, another layer, a paper, the spare image, an other project, the current custombrush, etc.

* The *Blend* popup menu is used to choose the mode to be used when drawing the *Source Image* or *Sequence* on your current Layer (Color, Behind, Erase, ...)

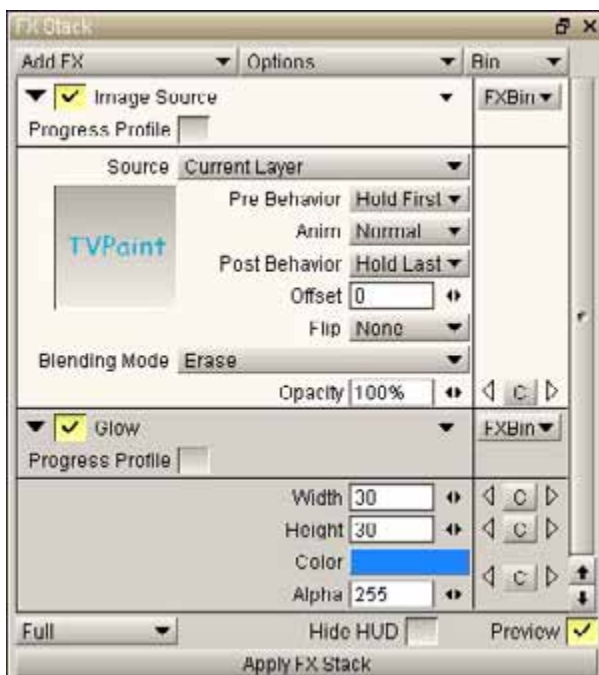
* The *Opacity* parameter allow you to adjust ... the opacity of the displayed image or sequence.

This effect could seem simple, even obvious, but it has a lot of useful applications :

1st example :



On the unique layer of our timeline, a «TVPaint» logo has been drawn. We are going to replace it by its own glow.



Let's take a look at the FX-stack opposite :

- 1) The first effect that will be applied is the *Stylize > Glow* effect.
- 2) The *Colors > Image Source* effect is the second effect that will be applied. The *Source* selected is *Current layer* and the *Blending Mode* is the *Erase Mode*.

In this way, the «TVPaint» logo will be removed just after the rendering of the glow on the screen.



This process works with other effects of the *Stylize* group like *Add Border* or *Bevel* (with *Outer* option selected). (For the *Drop Shadow* and *Toonshading* effects, please study the next example)

TVPaint

Original image

>>

TVPaint

After applying the effect
Stylize > Glow only

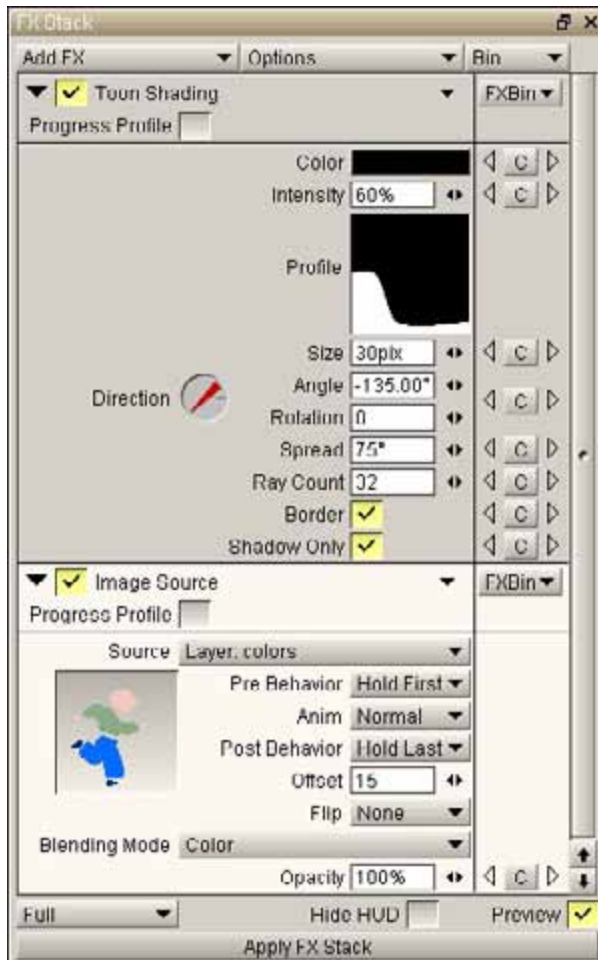
>>

TVPaint

After applying all the FX-stack

2nd example :

In this example, we will create a shadow for the running kid thanks to the *Stylize > Toonshading* effect. This shadow will be rendered on an empty animation layer.



In the FX-stack opposite, the *Stylize > Toonshading* effect will be applied on the animated layer called "Toon Shading". (see the timeline below)

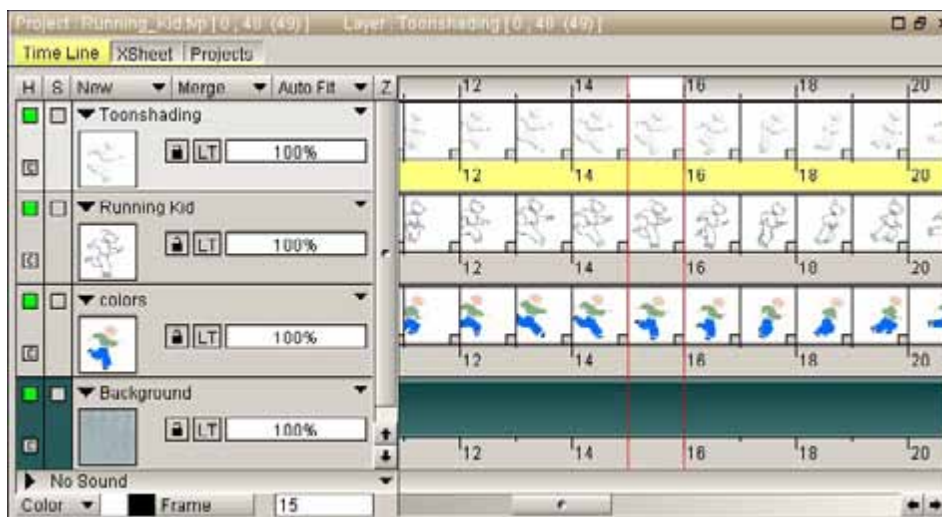
The effect *Colors > Image Source* allows you to specify the reference layer used to render the shadow. Here, the *Source* is the animation layer called "color".

If we use the *Erase* blending mode as we did in the first example, the shadow will disappear. (the toonshadow is inside the running kid)

That's the reason why we will keep the *Color* blending mode and use the *Shadow Only* option of the *Stylize > Toonshading* effect. It allows to create the shadow of the running kid without re-drawing it.

It is then possible to generate a shadow for our running kid on a separate animated layer. As a consequence, the character is not altered by the rendering of the shadow.

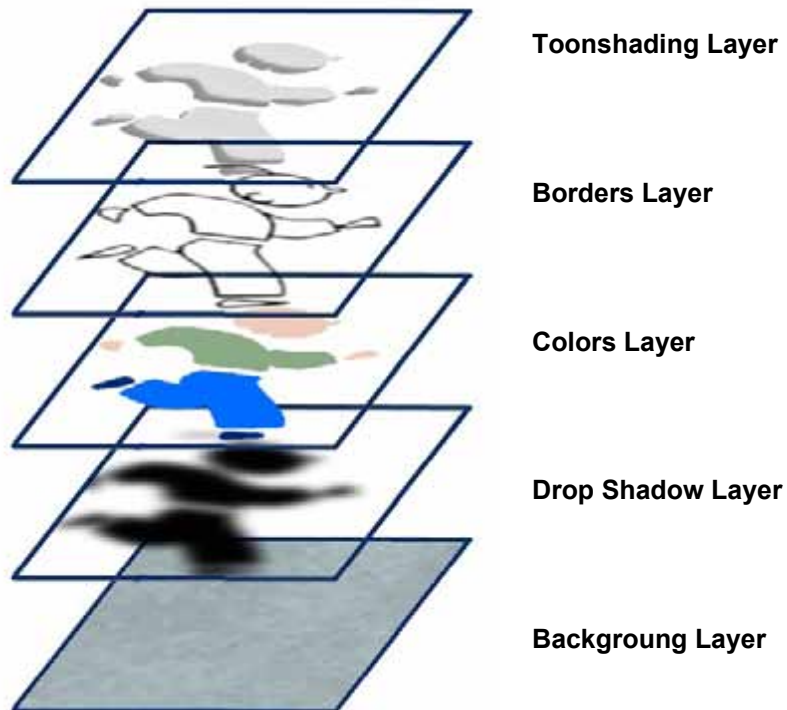
In this example, the *Colors > Image Source* effect allows you to define an image or an animation sequence as reference for the "following" toonshading effect in your FX-stack.



In this example, it is also possible to replace the effect *Stylize > ToonShading* by the effect *Stylize > Drop Shadow*. (the *Shadow Only* option is also present in this effect)

In that case, you will obtain a classical shadow. Of course, the character layers (*colors* and *Running Kid*) will stay unchanged.

Here is the 3D view of the layers you can obtain after using the effects *Colors > Image source*, *Stylize > Drop Shadow* and *Stylize > Toonshading*.



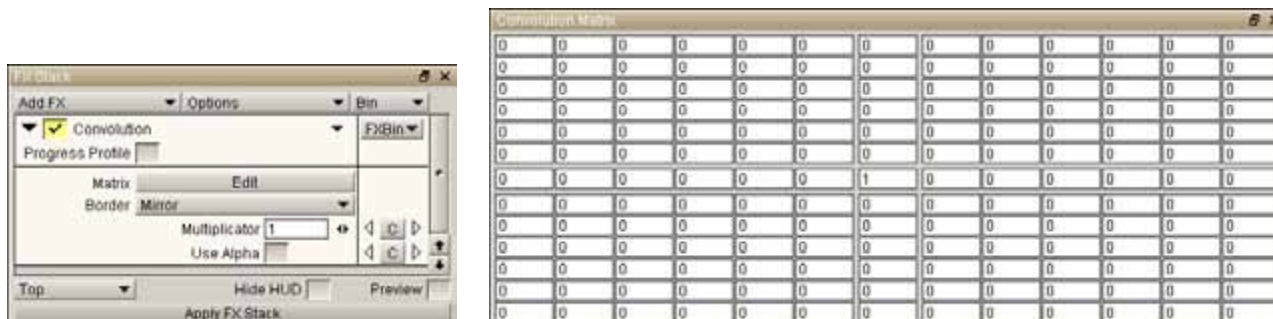
The resulting image

The Stylize > Convolve Effect

The effect *Stylize > Convolve* allows to modify the pixels of an image or an animated sequence by using a matrix (here above on the right).

For the neophyte, a matrix is an ordered set of numbers listed in a rectangular form. For the mathematicians, it is a powerful and convenient calculation tool used in algebra.

To open the matrix relative to this effect, just click on the *Edit* button of the panel.



The matrix of our effect contains 13 rows and 13 columns, and as a consequence 169 numerical fields. Each numerical value is usually called *coefficient*.

The grey boxes are located on the two diagonals of the matrix. It usually gives a better readability when you fill in the matrix.



We have already seen that each color can be broken up in various ways depending on the color system. For example, the *Slider* tab of the *Color Picker* panel gives the numerical values of the A color in the R,G,B and T,S,L color systems.

The *Stylize > Convolve* effect calculates a new value (and so gives a new a color) for each pixel in an image or an image sequence by using the values (and so the colors) of its neighboring pixels.

In the mathematical point of view, each new value in the R,G,B color system will be calculated by taking the average of itself and the pixels surrounding it. It a weighted average using the matrix coefficients.

Well, you are an animator, not a mathematician, it doesn't help you a lot to get an idea of the internal working of this effect...

How to obtain convincing results by changing the numerical values of the matrix ?

The examples below should help you in this task.

1st example : How to create a Blur

3	3	3
3	1	3
3	3	3

Let's take a look at the matrix opposite : each coefficient is equal to 3, except the central coefficient which is equal to 1. All the other coefficients are equal to zero (and not visible here)

Using this 3x3 matrix (3 rows, 3 columns) will make each pixel modify itself according to its neighboring pixels.

The surrounding pixels will have more weight (or will be more represented) than the central pixel : this is exactly the common process to render a blur effect.



Here is an example. In the TVPaint logo opposite :

3	3	3
3	1	3
3	3	3

* The white and opaque pixels outside the TVPaint logo are most often surrounded by opaque white pixels.
A weighted average of white pixels gives ... a white pixel.

3	3	3
3	1	3
3	3	3

* The blue pixels inside the TVPaint logo are most often surrounded by blue pixels.
A weighted average of blue pixels gives ... a blue pixel.

* For the pixels located at the frontier between the blue and white areas, the situation is a bit more complicated : a weighted average of blue and white pixels gives a more or less light blue, as shown below :

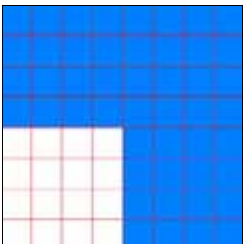
3	3	3
3	1	3
3	3	3

3	3	3
3	1	3
3	3	3

3	3	3
3	1	3
3	3	3

3	3	3
3	1	3
3	3	3

Below, two zooms on the « T » letter of the TVPaint logo :



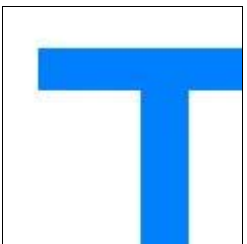
>



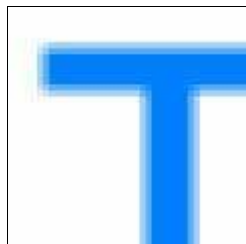
From the result above, it is possible to deduce the result of the *Stylize > Convolve* effect on some pixels

Before applying the effect

After applying the effect



>



Here is the result on a wider area of pixels.

The TVPaint logo begin to get blurred ...

And here is the final result :



>



Before applying the effect

After applying the effect

2nd example : What happens with a bigger matrix ?

3	3	3	3	3
3	3	3	3	3
3	3	1	3	3
3	3	3	3	3
3	3	3	3	3

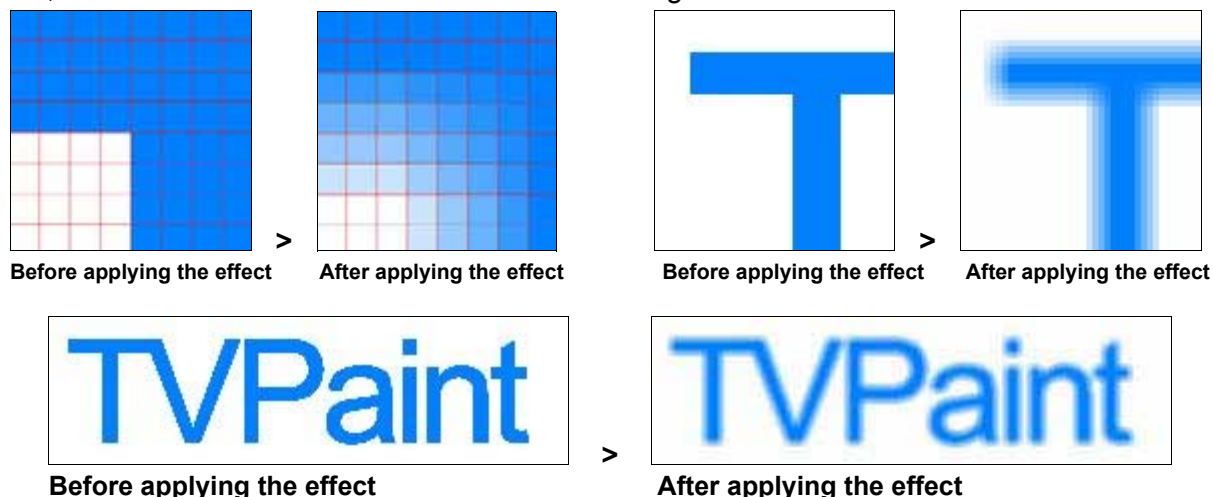
Let's take a look at the matrix opposite : each coefficient is equal to 3, except the central coefficient which is equal to 1. All the other coefficients are equal to zero (and not visible here)

Using this 5x5 matrix (5 rows, 5 columns) will make each pixel modify itself according to its neighboring pixels. We use here a larger radius than in the 3x3 matrix of the first example.

3	3	3	3	3
3	3	3	3	3
3	3	1	3	3
3	3	3	3	3
3	3	3	3	3

In this case, the principle is the same as the one enunciated above, but more pixels are taken into account to calculate the average
It gives a larger blur than the one obtained with the 3x3 matrix.
(see next page)

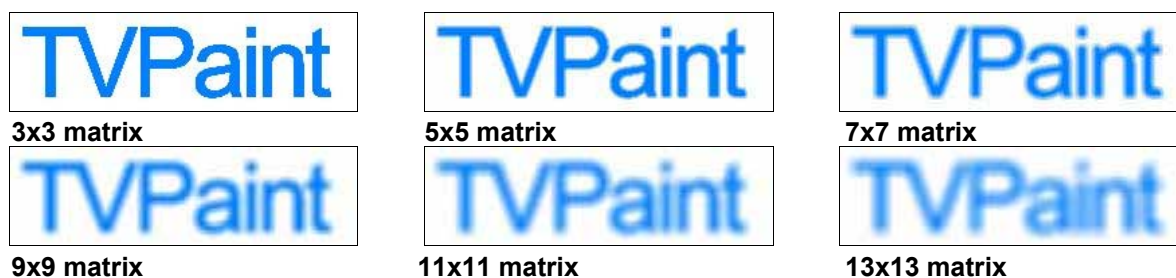
Below, two zooms on the « T » letter of the TVPaint logo :



It is easy to understand that the bigger your matrix will be (the more coefficients equal to 3 in our example), the more pixels will be used to calculate the resulting colors. (the larger will be the blur in our example) Here is what you can expect by using bigger matrix, constructed in the same model than the one above.

TVPaint

Above the source image. Below the blurs that you can obtain by using a :



The execution speed of the *Stylize > Convolve* effect depends on the number of coefficients which are different from zero inside the matrix. In other words, the more zero coefficients you will have in the matrix, the faster the effect will be applied.

3rd example : How to have a sharper image :

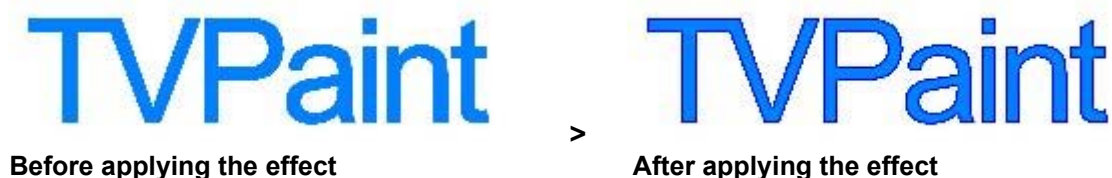
Obtaining a sharper image is the opposite as obtaining a blurred image.

The surrounding pixels will have less weight than the central pixel : in other words, they will be less represented than the central pixel.

-2	-2	-2
-2	22	-2
-2	-2	-2

Let's take a look at the matrix opposite : each coefficient is equal to -2, except the central coefficient which is equal to 22. The central coefficient is really higher than the coefficients surrounding it.

Now we can apply this effect to our logo :



As seen above, the weighted average of the blue (or opaque white) pixels gives ... a blue (or white) pixel. That's is not always the case, as we will see later.

-2	-2	-2
-2	22	-2
-2	-2	-2



For the pixels located at the frontier between the blue and white areas, the situation is a bit more complicated : they will become more visible than the blue and white pixels surrounding them.
In other words they will become a little darker.

It results a sharper image ...

4th example : how to draw the edge of a picture :

In order to obtain the edges of a picture, you need to have a sharper image and you need also to make the pixels surrounded by same color pixels become black.

-2		-2
-2	16	-2
-2	-2	-2

To do so, we will use a matrix which coefficients are close from those we used in the last example. Please note that the sum of the surrounding coefficients is equal to the opposite of the central coefficient.

In this case, the pixels surrounded by pixels with the same color will become black. The weighted average of the values (or colors) is equal to 0.

The pixels at the frontier between the blue logo and the white background will be strengthened. Here is the result :

TVPaint

Before applying the effect

>

TVPaint

After applying the effect

5th example : How to emboss an image.

Adding relief to an image can be done by strengthening the pixels colors in a given direction and by reducing the impact of the pixels colors in the opposite direction.

0	0	0
3	1	-3
0	0	0

The matrix opposite allows to emboss the image as if a light source was added at its right. (all the layers have been merged before applying the effect)



Before applying the effect

>



After applying the effect

Now, let's study a few notions :

* We saw that our effect was modifying the color of the pixels on the screen. It is also possible to modify the pixels transparency by using the *Use alpha* button.

In this case, the calculation of the weighted averages is applied to the alpha component of the pixels too.

* The *Border* popup menu allows to choose how the pixels at the border of the image will be calculated. (The pixels located at the border of your image don't have neighboring pixels ...)
You can choose to use as neighboring pixels :

- Black pixels (*none* option)
- Pixels resulting from a symetry of your image (*mirror* option)
- Pixels resulting from reproduction of the image (*tile* option)
- Pixels resulting from reproduction of the last (first) line (or column) of pixels (*repeat* option)

* The *multiplying coefficient* allows to multiply all the coefficients of the matix by the same value.
It does not change anything to your picture if all non-zero coefficients of your matrix are the same.
Otherwise your convolution effect will be more or less pronounced.

Some preset examples :

Now that you have some basis about the convolution matrix, you can try to modify the numerous matrices at your disposal in the *bin* menu of your effect.

Above, you will find the results obtained with the matrix :



Blurred Image



Splitted Image



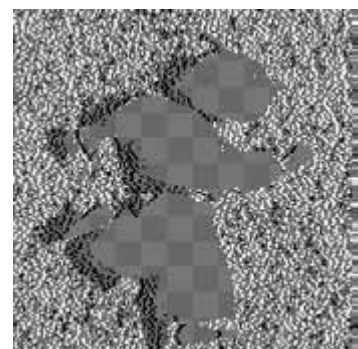
Only the edges



Embossed Image



Special lightning



Other Results

Lesson 13

The effects of the *Distortion* group

In this lesson, you will:

- Manage the symmetry effects: *Flip*, *Mirror*, *Kaleidoscope*, ...
- Manage the Wrapping effects: *Bump*, *Waves*, *Tornado*, ...
- Create a shadow in perspective.
- Animate with the *Wrapping Grid* effect.

The *Distortion* > *Flip* effect

This effect permit to flip horizontally and/or vertically images in the current layer (see the examples below). This effect does not use or require animation keys.



Source Image



Vertical flip



Horizontal flip



Horizontal and vertical flip

The *Distortion* > *Mirror* effect

This effect allows you to do a symmetry in relation to an axis in the current layer.

* The *Pivot X*, *Pivot Y* and *Angle* numeric fields allows you to define the axis the symmetry will be applied to.

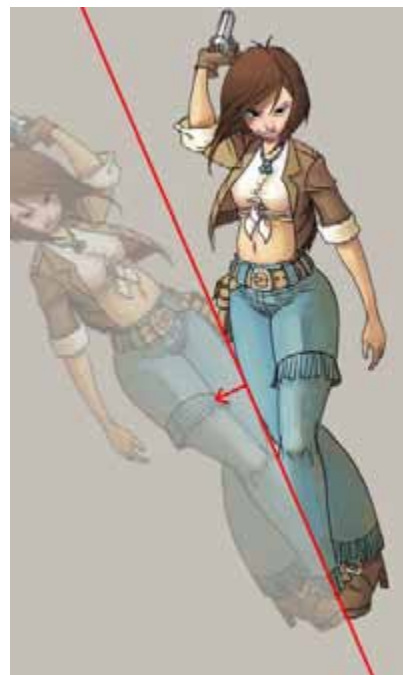
* When using animation keys, the *Rotation* parameter reflects the number of complete rotations to be carried out before arriving at the chosen angle.

* The *Opacity* parameter allows you to adjust the transparency of the reflected image.



Source Image

>>>



Mirror effect, opacity 50%



If needed, you can move the axis through the HUD interactively in the current project window.

The *Distortion* > *Kaleidoscope* effect

As the name implies, the effect imitates the view through a kaleidoscope. In the following paragraphs, the projects will be considered as having the layers merged.

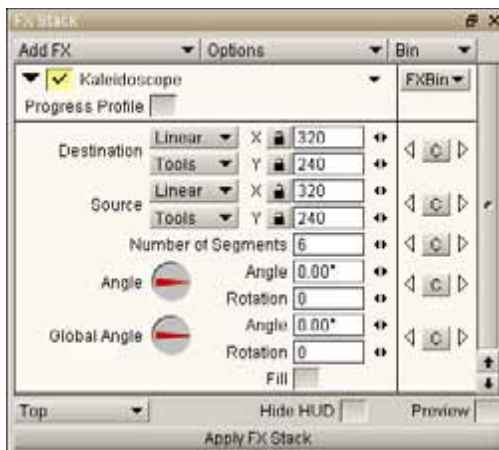


Original image

>>



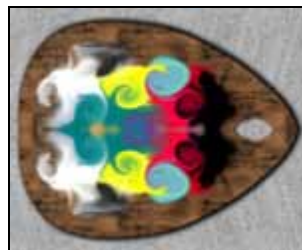
Use of the *Kaleidoscope* effect



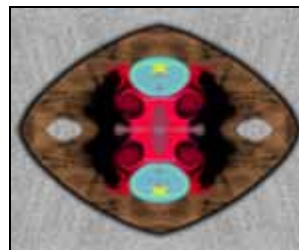
The number of segments is the number of symmetric axes used to obtain the final image (see below).



Original image



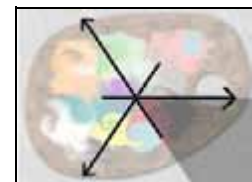
One horizontal symmetric axis

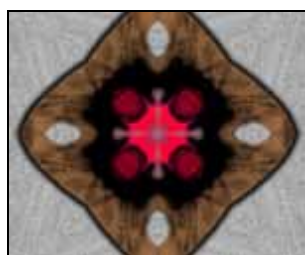


Two symmetric axes (horizontal and vertical)

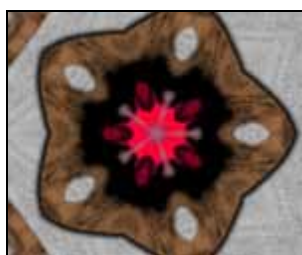


Three symmetric axes

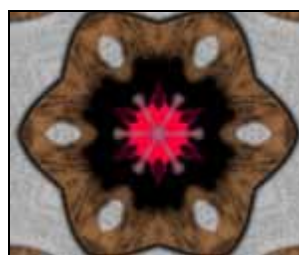




Four symmetric axes



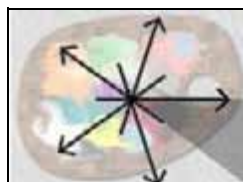
Five symmetric axes



Six symmetric axes



Eight symmetric axes



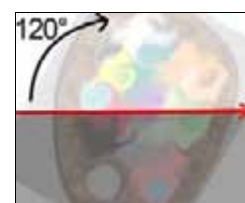
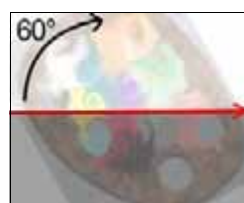
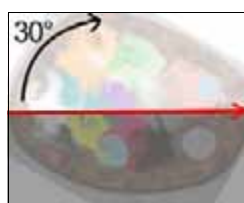
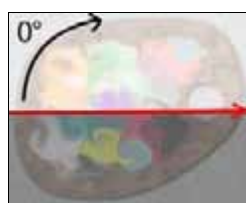
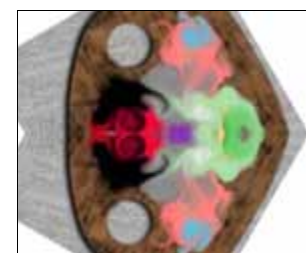
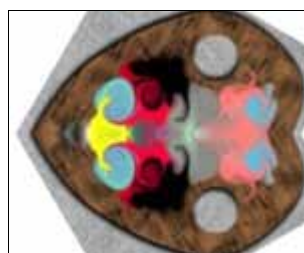
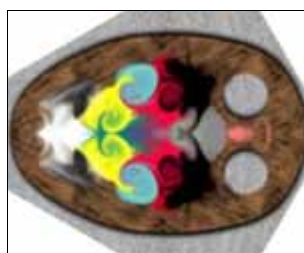
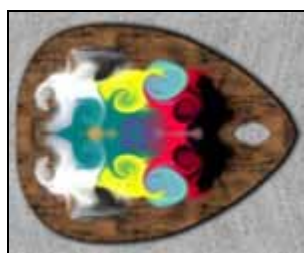
And so on ...

The value of the first angular parameter varies the axis formed between the symmetric and the horizontal axis.

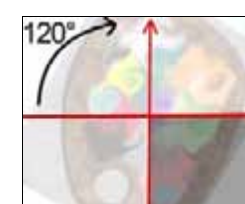
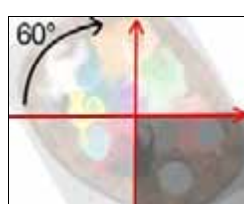
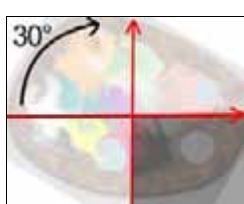
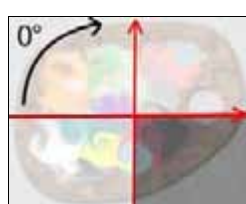
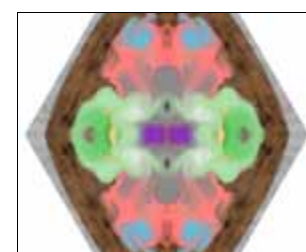
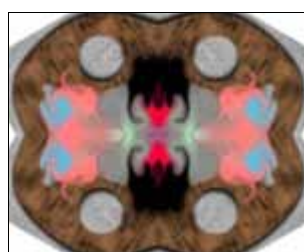
The grayish diagrams indicate the area in the original image which will be duplicated by the symmetry.

In black, the rotation angle applied before symmetry in relation to the red axes.

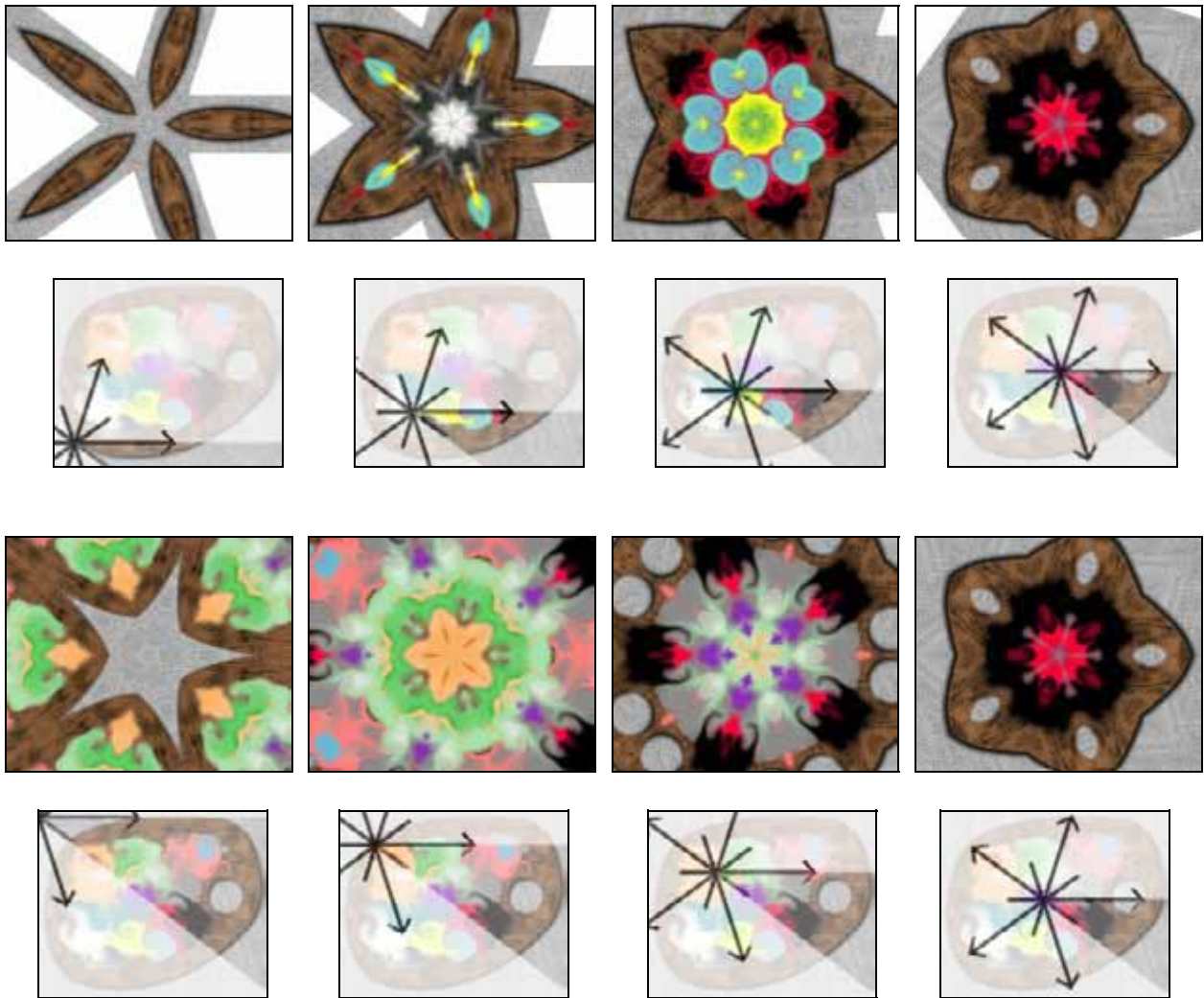
Here for one symmetric axis :



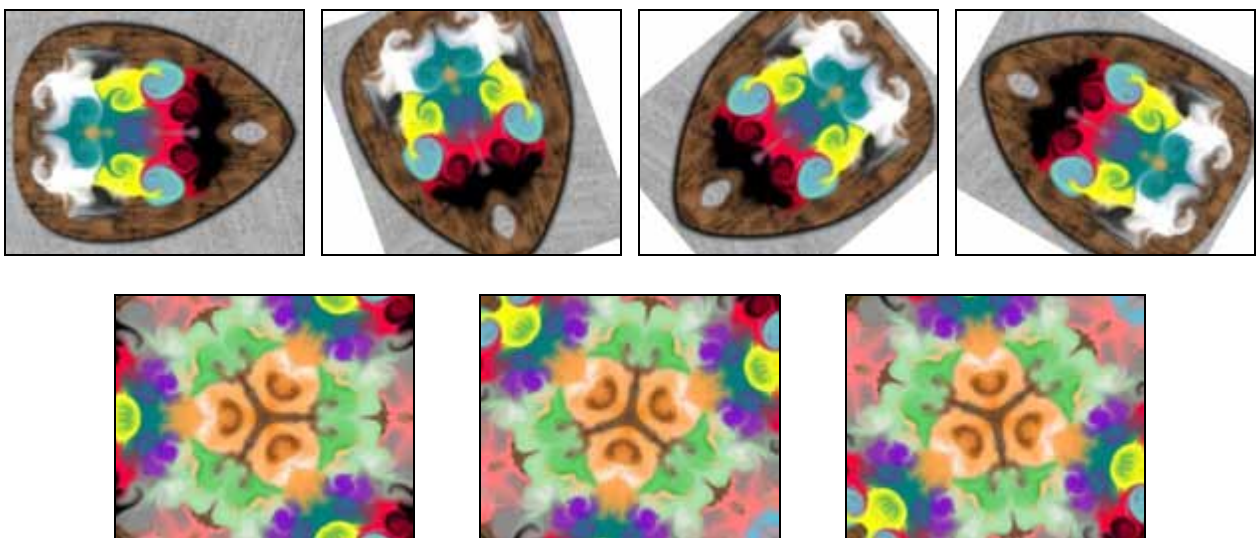
Here for two symmetric axes :



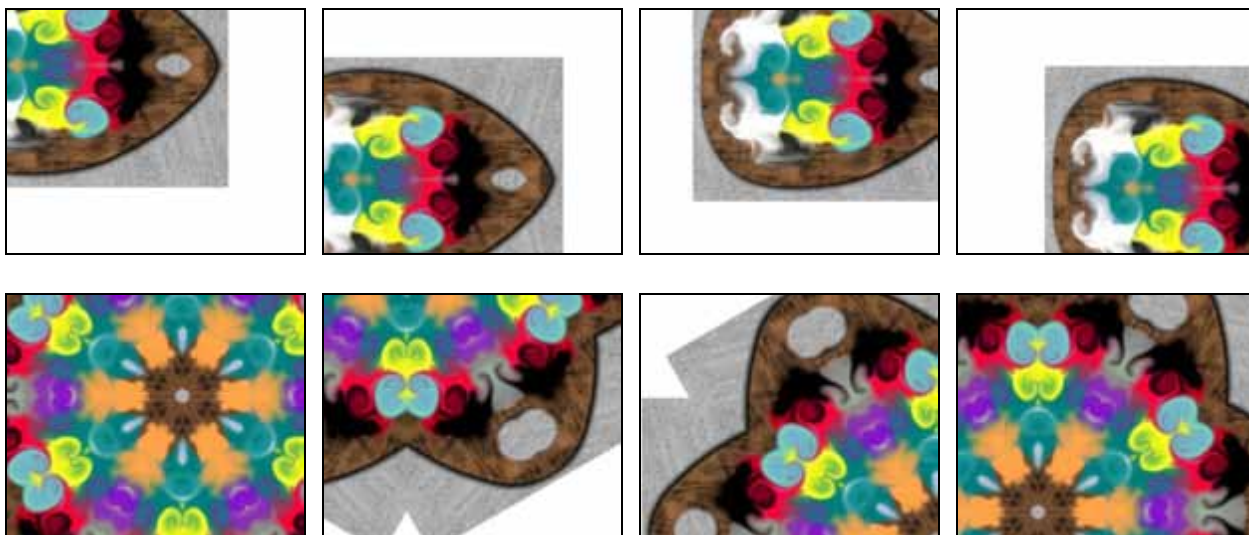
The *Source* coordinates define the position on the screen of a point at which the symmetry axes cross each other (see the various examples hereafter).



The value of the second angular parameter is used to vary the global angle of the image obtained:



The *Destination* coordinates define the position on the screen of an image centre obtained after application of the effect (see the various examples hereafter).



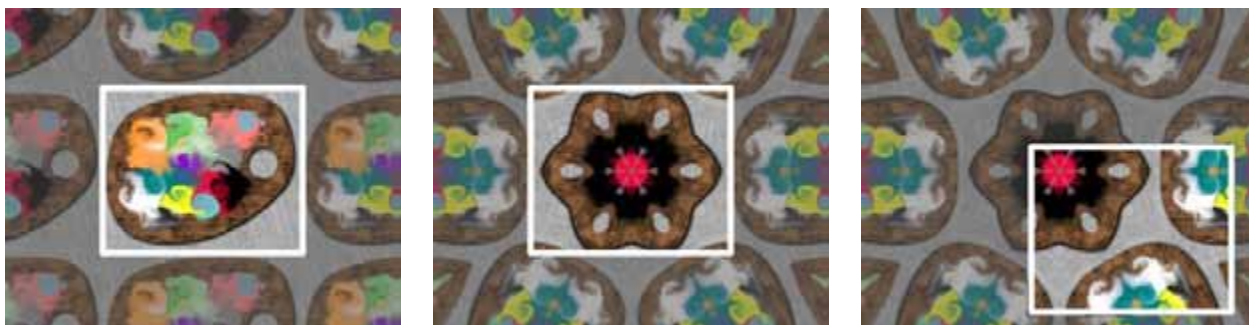
When the *Fill* option is disabled, the kaleidoscope effect is calculated according to the current image. When it is enabled, the calculation is also carried out on all reproductions of the current image.

Below, the area inside the white rectangle represents the current project window. All areas inside and outside the white rectangle represent the space used to calculate the effect.

In the 1st case, the option is disabled, the effect is calculated from the current image.
In the 2nd case, the option is enabled, the effect is calculated from the current image and its reproductions.



In both cases the original project is represented with the result after the effect is calculated and the other showing the result obtained when the destination parameter is set to another point.



The *Distortion* > *Perspective* : 4 points effect

This effect is constructed in the same way as the *Perspective tool* from the main panel, except that the position of each point can be moved along a stored path.



Source Image



Current Image



Result after applying the stack

* The *Position* tab allow you to manage the coordinates of the four points used for this effect (the four corners of the H.U.D)

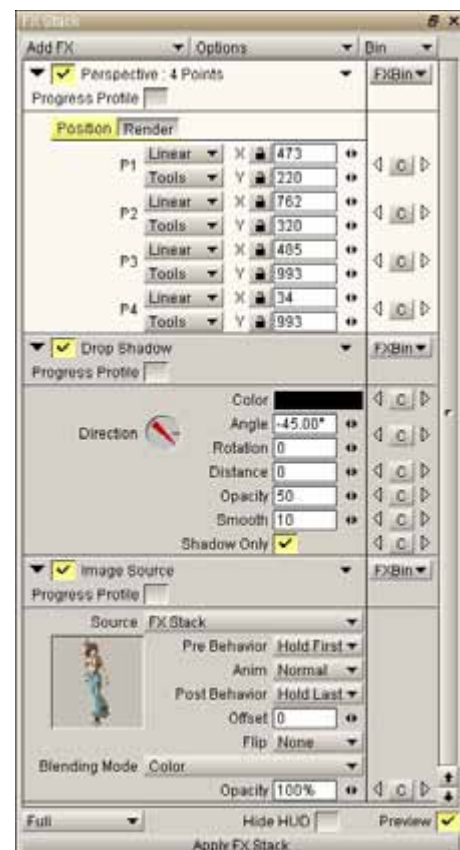
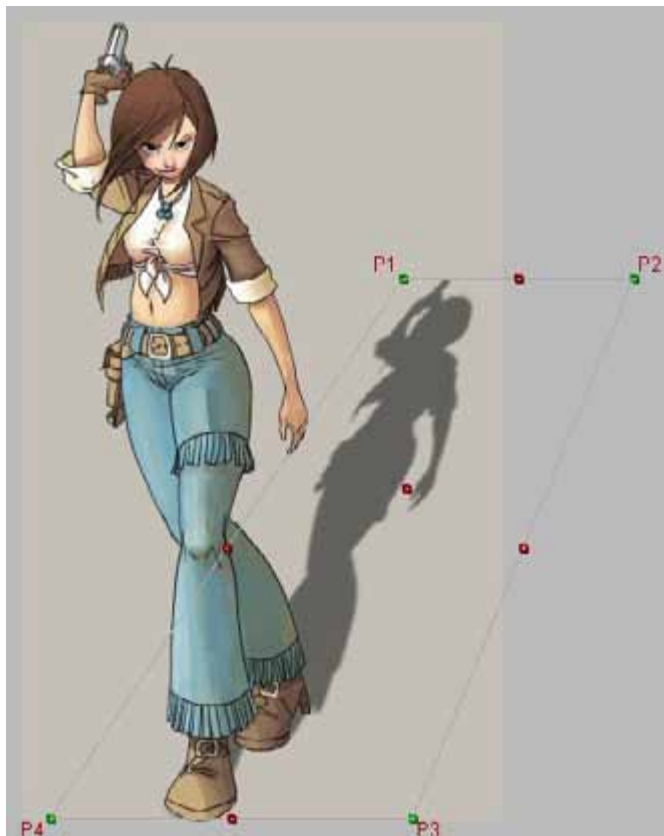
* The *Render* tab permit to select the type of image, called Source Image, which will be put in perspective (current layer, FX-Stack, other project, brush, etc.).



Associated with the *Pixel Tracker* (this option will be explained in details in the next lesson), this effect can wrap a video sequence or a picture onto a moving shape. This could be the case if the cameraman was moving his recorder while filming the computer screen above.

Here below, a shadow was created for our character. The two effects *Color* > *Source Image* and *Stylize* > *Drop Shadow* were used in order to have the shadow drawn on an empty layer (go back to the last chapters of the last lesson for more details).

This shadow was put into perspective thanks to our effect. We succed to imitate the projection of a shadow on the floor.



The *Distortion > Wave* effect

This effect imitates water waves, as if a rock was thrown into water. (look at the images below).

- * The *Center* parameter defines the center of the effect, the position where the rock hits the water.
- * The *Radius* parameter defines the maximal distance the waves will go.
- * The *Wave* parameter defines the number of visible waves.
- * The *Amplitude* parameter defines the maximum height of the waves.
- * The *Angle* and *Rotation* permit to animate the waves in time.



Once again, these parameters can be partly adjusted in the project window through the H.U.D.

The *Distortion > Tornado* effect

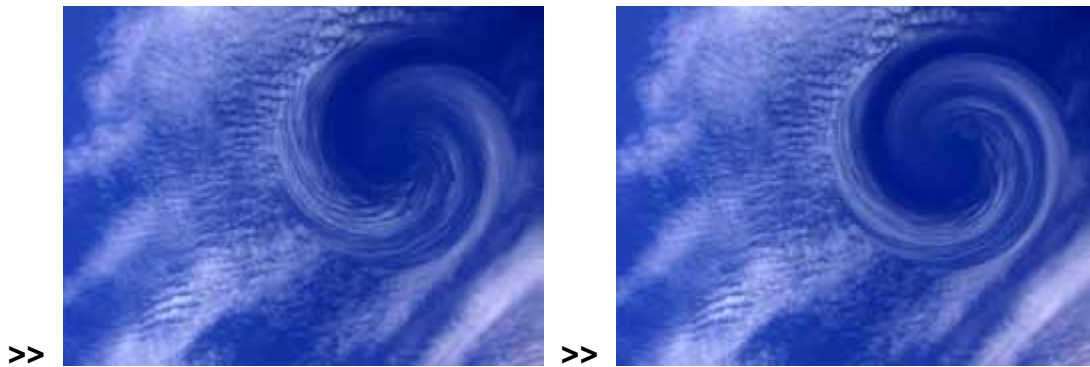
We will take advantage of this image which show clouds to study the *Distortion > Tornado* effect.

Have you ever noticed how a whirlpool behaves in a washbasin for example ?

The *Distortion > Tornado* effect produces the same kind of effect, distorting the image or the image sequence (look at the images below).

- * Like the *Wave* effect, you will need to define a *Center* and a *Radius* (which can be locked with animation keys if needed...).

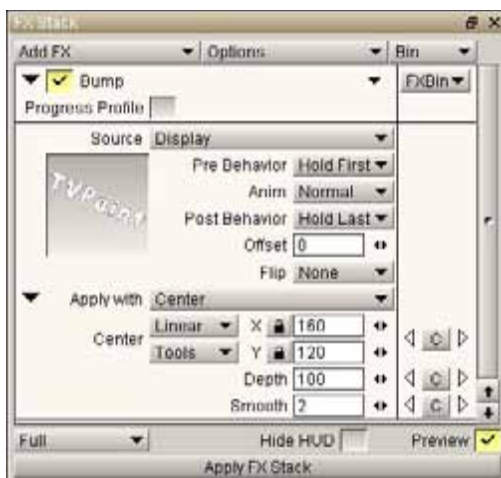




* The *Angle* parameter allows you to define the power of the applied distortion.

* When using animation keys, the *Rotation* parameter reflects the number of complete rotations to be carried out before arriving at the chosen angle.

The *Distortion > Bump* effect



The *Bump* effect allows the creation of a relief, which will be provided by a source image, over the current layer.

The more luminous the source image is, the more important the relief of the pixels in the current image is. The darker the source image is, the less visible the relief is.

On the right below, the source image and the current image are the same. It gives a feeling of relief on the whole screen.



Current image



Source image = Current image



Source image = TVPaint logo



Source image = paper

* You can adjust the depth of the relief and soften the borders using the numeric fields *Depth* and *Smooth*.

* A relief requires a lighting to be visible : thanks to the *Apply with* menu, you can define a centered lighting thanks to the *Center* option, or a directionnal lighting (*Direction* option) whose angle will have to be adjusted.

The *Distortion > Displacement Mapping* Effect



The *Displacement Mapping* effect works the same way as the *Distortion > Bump* effect : the panel and settings are the same.

Regarding the *Displacement Mapping* : the pixels from the current image which correspond to the pixels from the source image will be replaced by different pixels from the current image.

That means : the software makes a translation of the current image pixels along a direction or a center, only in the opaque areas of the Source image.



Current image



Source image = TVPaint logo

The more luminous the Source image is, the more important the displacement of the pixels in the current image is. The darker the Source image is, the less visible the *Displacement Mapping* is.



Source image = paper



The *Distortion* > *Wrapping Grid* effect



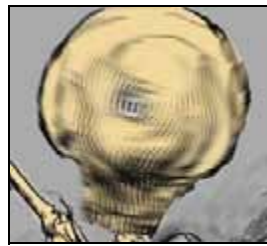
The wrapping grid is an extremely useful animation tool and is capable of distorting the images in time according to the criteria of your choice.

The *Wrapping grid* effect, when correctly used, can produce quite spectacular results: wave movement, 3D rotation of faces, movement of hair blowing in the wind, etc... (below, you will find a summary overview of the possibilities proposed).



1st image

>>



Movement

>>



Last image

(project skull.tvp)

Once the effect has been placed in the FX stack, a grid is displayed on the current image.

Some hints for beginners:

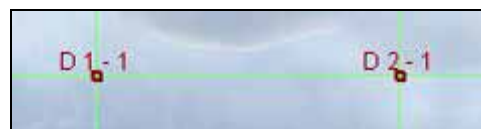
* The use of two grids will be necessary for your effects to work correctly: these grids are referred to as *Source* and *Destination* grids.

The *Display* popup menu is used to select on which of the two grids you intend to work.

Depending on your choice, the *HUD* will be modified accordingly: the letter *S* appears when the source grid is displayed and the letter *D* appears if the destination grid is displayed.

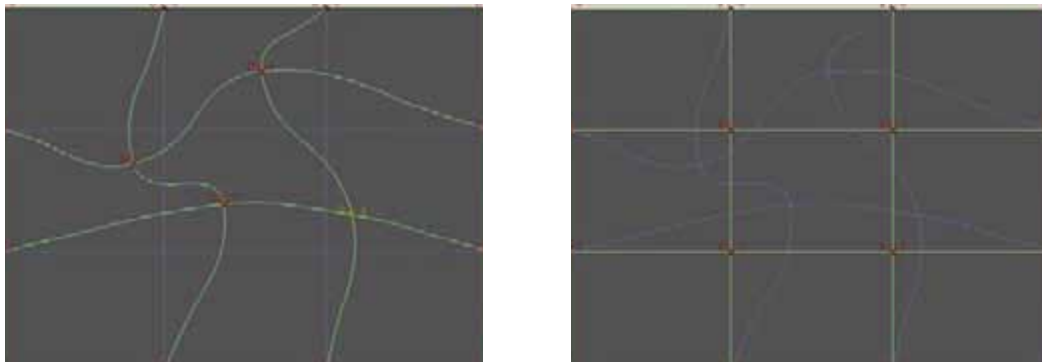


Intersections in the *Source* grid



Intersections in the *Destination* grid

In the *HUD*, when the source grid is displayed, the destination grid is always visible behind in a less bright color. When the destination is displayed, the opposite case applies (see next page).



Display of *Source* and *Destination* grids (the current grid is green, the other is blue)

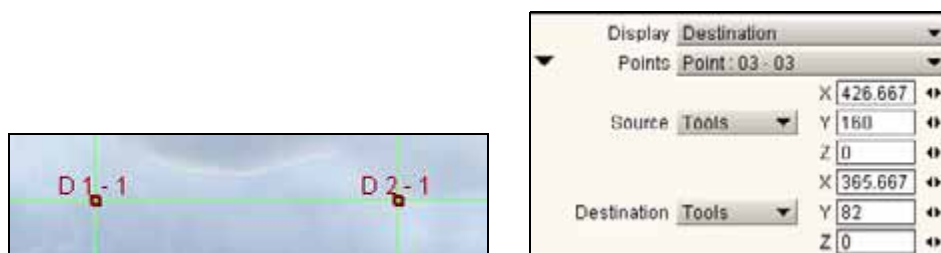
* Modification of an intersection in the *Source* and/or *Destination* grid distorts the current image accordingly.

The image is distorted, stretched or contracted over a narrower or wider area on the screen so that the points on the source grid of your initial image are moved to the same location as the points on the destination grid.

Below, source and destination points on a grid with the resulting distortion.



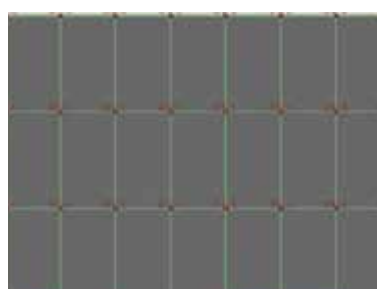
* The *Point* menu is used to edit each grid point present on the screen. The latter may be identified by their position on the grid (see below).



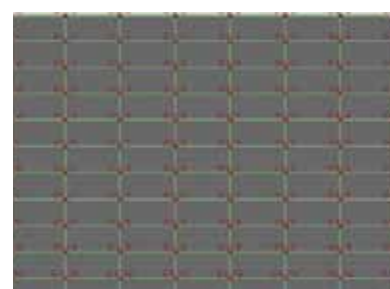
* The first two numeric fields are used to select the number of intersection points on your grids (*Source* and *Destination* grids have the same number of intersections). You may increase or decrease the height and/or width of these grids.



4 x 4 grid



8 x 4 grid



8 x 12 grid

* The five buttons      present in this panel are used respectively to:

- Edit grid points.
- Distort the grid as a whole.
- Copy the source grid to the destination grid.
- Copy the destination grid to the source grid.
- Swap source and destination grids.

Edit grid points

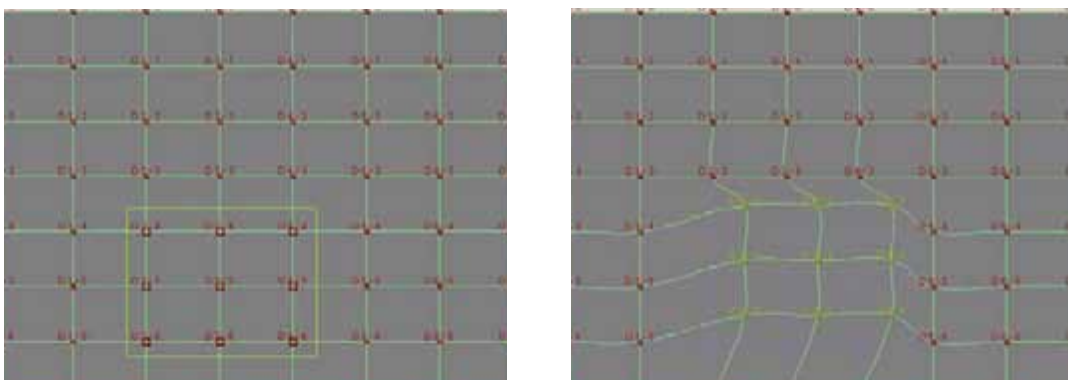
* When this option is enabled, each intersection point of your grid (source or destination grid) may be moved in space along three axes (*width*, *height* and *depth*) the effect of which will result in immediate distortion of the current image.

You may also use the predefined paths to manage intersection movement.

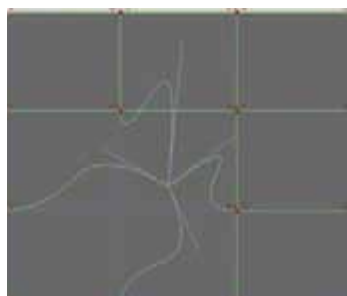


Above, from left to right, the initial image, movement of the destination intersection along the X and Y axes, movement of the destination intersection along the Z axis.

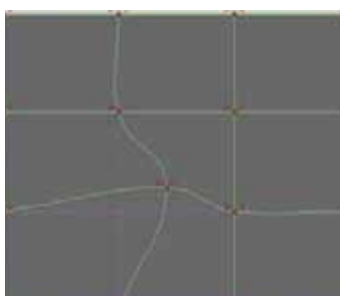
* It is possible to select several intersection points when the HUD is visible by drawing a rectangle inside the HUD. Once this has been done, it is easy to carry out all movements with a single click and slide on an intersection.



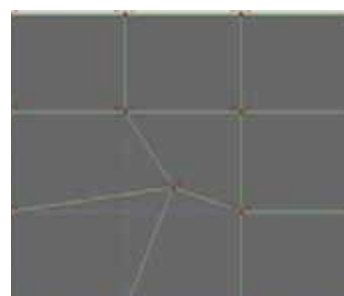
* It is possible to choose an intersection interpolation mode (linear, spline or smooth) in the first effect popup menu (see below).



Spline interpolation



Smooth interpolation



Linear interpolation

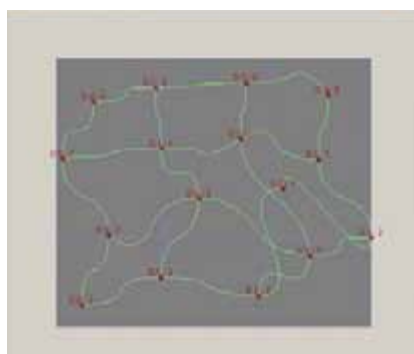


If the interpolation mode chosen is *Spline*, use of the [Shift] key when moving the handles enables movement of one handle at a time.



Edit grid bounding box

When the second icon is selected, it is possible to distort the current grid as a whole by rotating it or by modifying its dimensions (see below).



Original grid



Grid with 30° rotation



Grid with height divided by two



Swap the source and destination grids

This option is practical when creating a distortion opposite to that of the current distortion.

Below, the rear end of the arrow represents the *Source point* of the grid and the arrow tip corresponds to the *Destination point*.



Distortion: Source => destination



Distortion: Destination => Source



Distortion of the current image in time.

We just saw how to distort an image in space using the source and destination grids. To distort the current image in time as was done for the «skull.tvp» project, you must:

- * Duplicate the latter along the entire layer.
- * Unactivate the previsualisation of the effect (use the menu at the bottom left of the FX-Stack)
- * Set the display option on *Source*.
- * Pay attention to place intersections of the *Source Grid* at all strategic points on the image : eyes, teeth, etc ... and ensure the grid covers the lines of your drawing.
- * Copy the *Source Grid* to the *Destination Grid*.
- * Reactivate the previsualisation of the effect.
- * Set the display option on *Destination*.
- * Make the *Destination Grid* slightly different from the *Source Grid* for at least the first and last frames of the animation layer and then create the corresponding keys.

The result is a distortion, and consequently, a movement which takes place over a period of time.

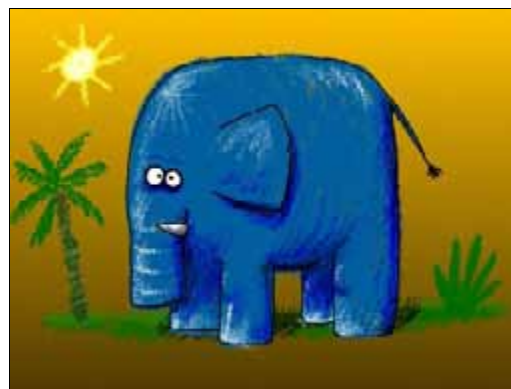
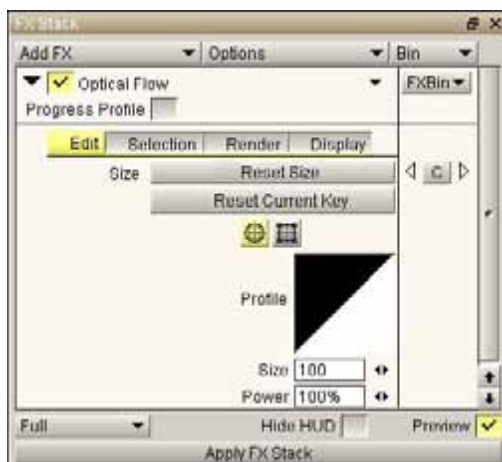


The method described above is not the only way of using this effect. Many others exist. You should try them out and share your impressions in the on-line forum.

The Distortion > Optical Flow effect

The purpose of this effect is also to distort the current image or animation, but in a different way than the *Distorsion > Wrapping Grid* effect. It uses a vector field instead of a grid. This vector field defines a flow that will be followed by the pixels of the current image.

This effect comprises four tabs :

• **The Edit tab**

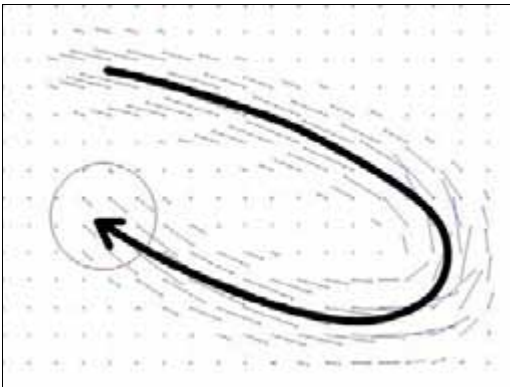
L'image source

- * The first button allows to set the size of the vector field. More exactly it allows to set the number of vector that you will use on both the horizontal and vertical axis.

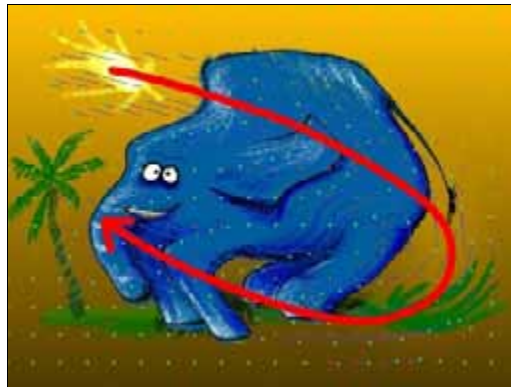
Once you have chosen the size, you can edit the current vector field itself.

To do so, display the H.U.D and draw directly on the screen (to be exact : on the H.U.D) with the purple circle, as shown below.

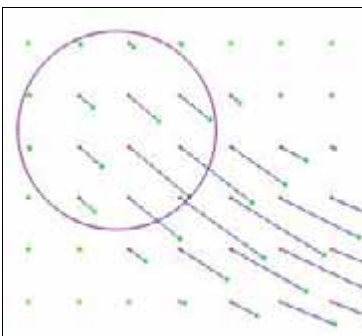
If you have a picture behind the vector field, you should see the render of the distortion.



Vector field



Modified image



The left mouse button allows to increase the tension of the vectors in a chosen direction.

The right mouse button allows to decrease the tension of the vectors in a chosen direction.

The red points are the source points of your vectors, (they can't be moved)

The green points are the destination points your vectors,


The blue segments are the vectors themselves.



For a given picture in your timeline, modifying the vector field creates an animation key.


If more than one animation key is created in the timeline, it means that your vector field and thus the distortion will evolve in time.

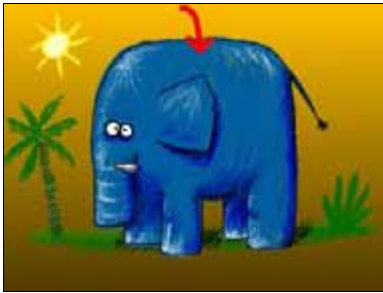
* The *Reset Current Key* button reset the vector field of the current picture in the timeline. If this picture does not have an animation key, a new one will be automatically created.

* The button :  allows to modify all the vectors of the field in only one operation. This tool is perfect if you need to distort, move or pivot an image entirely.



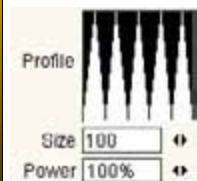
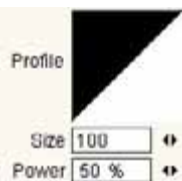
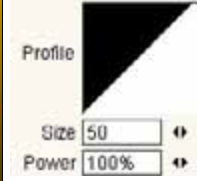
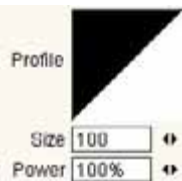
The more vectors you will use, the more time you will need to render the effect.

* The button :  allows to change the parameters of your H.U.D brush (i.e : the purple circle)
Like the common tools (airbrush, etc ...) that you use to draw, you can set its profile, size and also power.

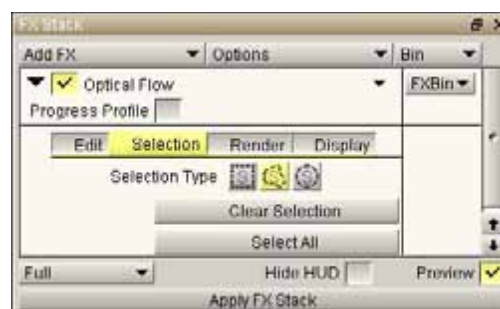
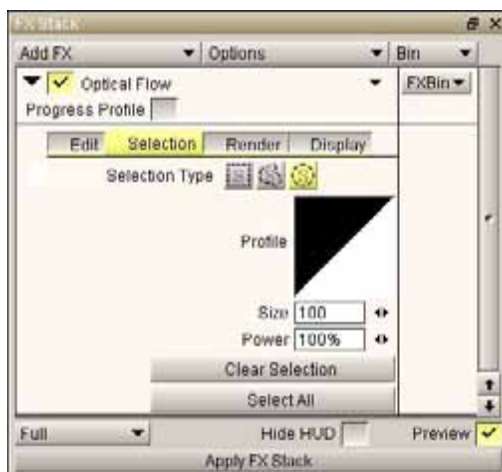


Let's admit that we will always choose the direction opposite when editing our vector field (i.e : the red arrow) :

The pictures below shows the impact of the different settings at your disposal.






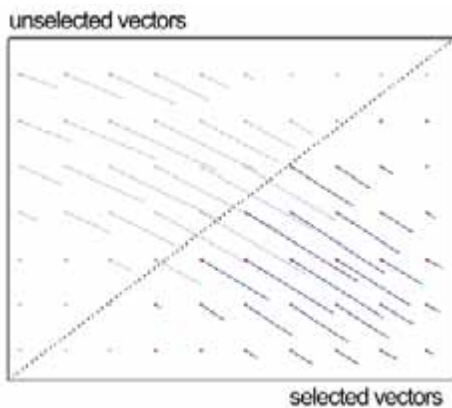
• The *Selection* tab



* In this tab, you can select the vectors of the field that you want to edit via the previously discussed tools.

By default, all the vectors are selected. The two buttons *Select All* and *Clear Selection* allows to reset the selections.

As in the main panel, you can use one of the three selections icons :    *Square, Freehand* or *Circle* selection.



When doing a selection, if a vector is selected, it appears in yellow instead of blue. (if you want to select a vector, just select its source)

If a vector source is not selected, its H.U.D color becomes lighter.

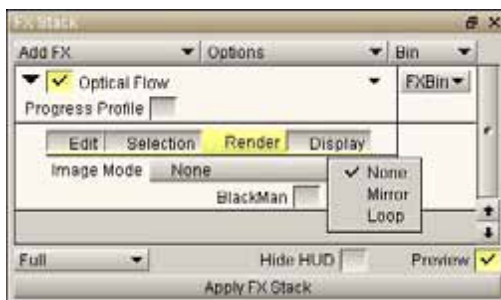
The tools available in the *Edit* menu will only apply on the selected vectors.

The circle selection use the same parameters as the H.U.D brush (the purple circle) so you can select your vectors by “drawing on the H.U.D”
It allows to have source points only selected in part and thus to have nice effects when editing the vectors.



Note that if you reset the size of the vector field, all the settings that you have done (vectors, animation keys, selections, ...) will be lost.

• The *Render* tab



The *Render* tab allows to choose :

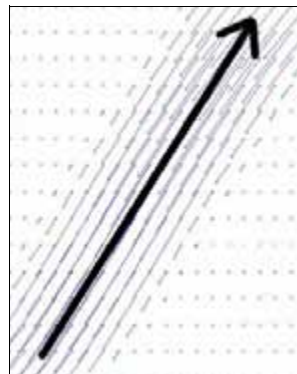
- * The calculation algorithm of the distortions (*Blackman* or *by default*)

- * The distortion mode of the image borders

(The example below illustrates the three modes at your disposal.)



Source Image



Vector Field



None Image Mode

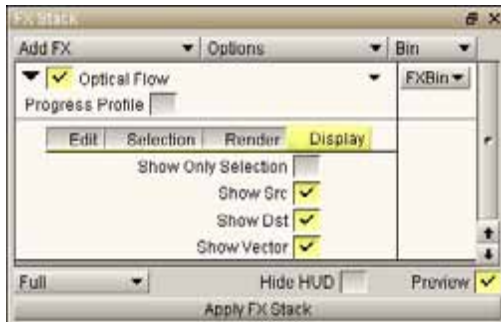


Mirror Image Mode



Loop Image Mode

- The *Display* tab



The three buttons: *Show Src*, *Show Dst* and *Show Vector* allow you to select exactly what you want to see on the H.U.D : the red source points and/or the green destination points and/or the blue vectors.

The button *Show Only Selection* allows to see only the vectors located inside the current selection.

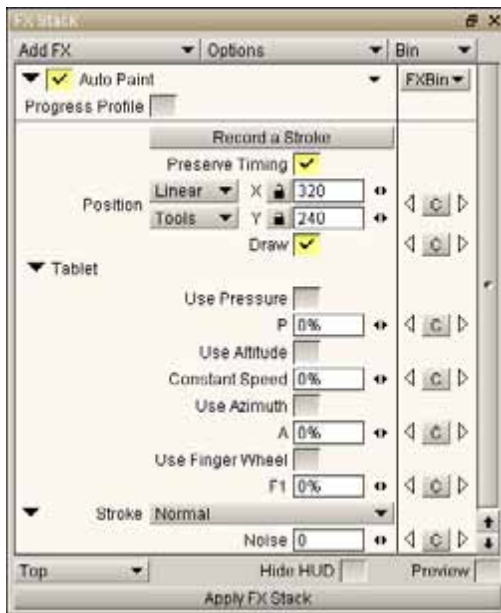
Lesson 14

The effects of the *Motion* and *Paint* groups, management of the paths

In this lesson, you will :

- Study the *AutoPaint* effect.
- Learn how to use paths.
- Study the Motion > *Keyframer* effect.
- Study the *Stabilization* effects.

The *Paint* > *AutoPaint* effect



Have you ever watched a weather report?

When the program is over, you often see the signature of the speaker(s) displayed on the screen.

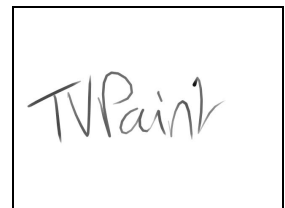
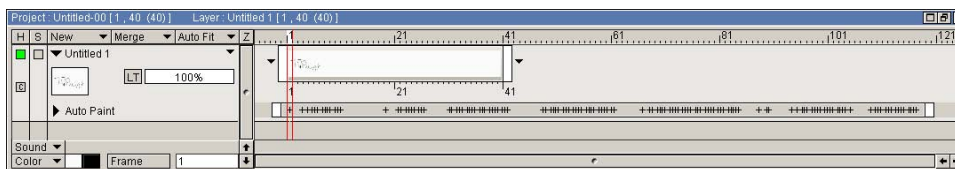
It is possible to reproduce this effect in TVPaint Animation Pro, using the effect *Paint* > *AutoPaint*.

This is the perfect way to dynamically sign your future animated works of art!

* First, you have to record the stroke which corresponds to the signature:
go onto an empty animation layer, click on the *Record a stroke* button in the *AutoPaint* effect and then draw your signature on the screen.

* When this is done, click on the *Stop* button or press the [Escape] key.

You have now recorded the signature in the program memory. A long series of keys is visible in the timeline (see below).



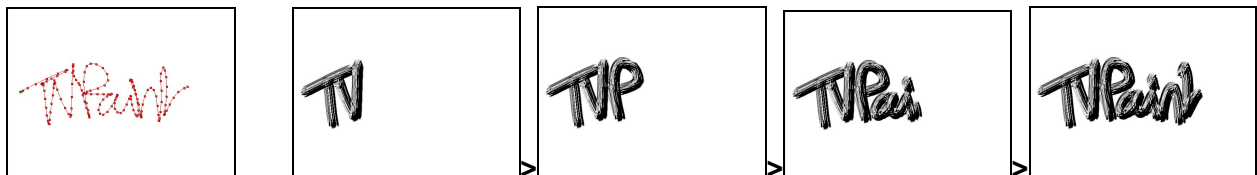
* Delete the current image on the screen (i.e. the signature).

* Select the tool of your choice and adjust its parameters for the future stroke of the signature.

* Stretch your animation layer so that it covers all keys of the timeline.

* Select all its images and then apply the FX stack.

When you play the project you will note that the signature is “drawn” progressively on the screen.



To ensure that your stroke is carried out on the number of images of your choice, two methods are available:

* You may stretch or contract the set of keys right after recording the stroke as indicated above.

* You may create an animation layer with the number of images desired and select all images before recording the stroke.

Let's now study the *AutoPaint* effect in detail:

* Recording the stroke generates a large number of key points on the timeline each of which stores the position of your stylus at a given moment. When the stroke is recorded, you may modify the position of the stylus on the screen for the key of your choice thanks to the numeric fields X and Y.

* For a given key, the *Draw* button indicates if the stylus was in contact with the tablet or not. If it is not enabled for a given key, there will be no stroke for this key (e.g. this is the case if you lifted the stylus during recording).

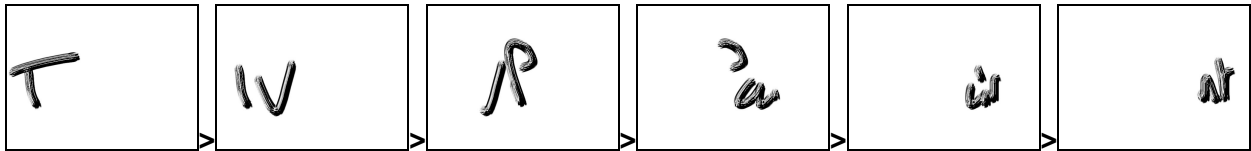
* Recording a stroke with the *AutoPaint* effect allows for other recordings, too : in particular the data relative to *Pressure*, *Altitude*, *Azimuth* and *Fingerwheel* available on the tablet. It is also possible to choose whether this data will be restored or not when applying the FX stack by checking or unchecking the corresponding boxes.

* The section *Stroke mode* offers several choices : *Normal*, *Size*, *Full* and *Last*.

These are results obtained using these modes:

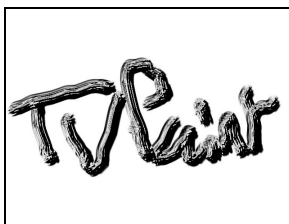
- The *Normal* mode progressively reproduces your stroke on the screen. This is the one we have been using since the beginning of this lesson.

- The *Size* modes requires adjustment of the parameter with the same name and will erase the stroke progressively in time.



- The *Last* mode is a kind of *Size* mode parameter set to value « 1 », which only draws one « point » of the stroke at a time.

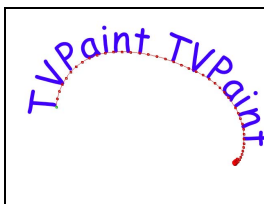
In *Complete* mode the complete stroke is drawn on the screen, independent of the circumstances.



* The last is the *Noise* parameter: it defines a possible deviation from the original path and is used to obtain less regular curves (see opposite, the TVPaint logo is slightly distorted, as if written with a trembling hand).

The *AutoPaint* effect is in a way similar to the *Re-apply* option as the result depends on the drawing tool selected just before application of the FX stack.

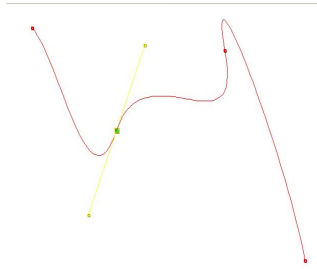
Here, two interesting examples :



Opposite, after recording a simple stroke in the shape of a semi-circular arch, the *AutoPaint* effect was applied using the *TextBrush* tool in *Letter* mode with the rotation parameter connected to the stylus direction.

The text seems to follow the defined path in time, each letter having its own rotation depending on its position on the path.

Management of *Paths*



In lesson 9, when studying the *Center Blur* effect, we already discussed the idea that an effect may make use of the *Position* parameters which will then define a path on the screen.

We will now discuss this *Path* notion in more detail.



When an effect authorizes use of a path(s) for one or several of its parameters, you have access to the *Tools* menu in the panel of the corresponding effect as shown opposite.

This is what it contains:

- * You may use the *Pixel tracker* to create a path.
- * You may also record a stroke on the screen, to create a path.
- * The third option of the *Tools* menu allows you to re-use a path you have already created previously in your effects stack and use it with the current parameters.
- * As is the case for the palettes, the tool settings, the effects, etc, a path may be renamed, saved, etc. The option *Path Manager* is used for all these tasks.
- * The option *Add to bin* allows you to save the current path under a name of your choice for later use (we have already done the same for customized palettes, mixers, tools).
- * The *Copy from path bin* allows you to re-use a path saved in the *Bin* for your position parameter.
- * The *Center* option replaces the position values for the current key with those of the center of the image.
- * The option *Reset* deletes all the keys of your effect.

The *Path recorder*

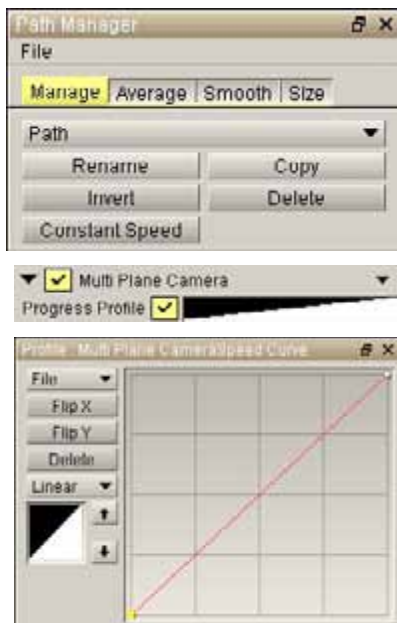
Path recording may also be carried out in any other effect to create a path. The option *Path Recorder* in the *Tools* menu relative to the position parameter(s) of your effect will help you to do this. The steps described above for the *AutoPaint* effect are still applicable in this case.



Using the standard *Path Recorder* allows you to generate a large number of keys containing position parameters, however, contrary to the *AutoPaint* effect it does not allow to restore pressure, azimuth and altitude.

The Path manager

The *Path Manager* mentioned above, has four tabs:



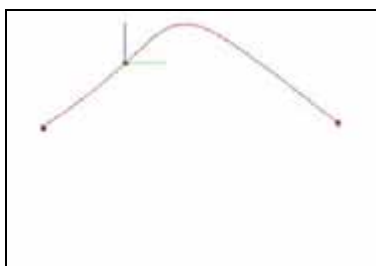
* The *Manage* tab allows you to choose a path amongst those already saved in the *Bin*, and then to rename, copy, delete or even invert it, (the path will in this case be taken in the reverse direction when used).

When you use an effect of the *Paint* or *Motion* group, the *Constant Speed* option move the keys of the path to keep the same speed along your path for your strokes or animations.

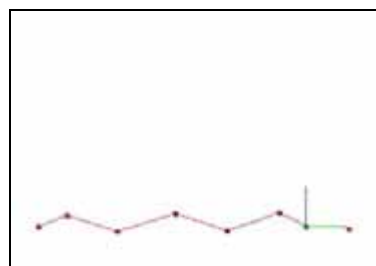
This is notably useful when you work with the *Motion > Keyframer* or *Motion > Multiplane Camera* effect. The speed of the moved images or the speed of the camera movement will be directly linked to the *Progress Profile* of those effects. The speed control will then be optimised.



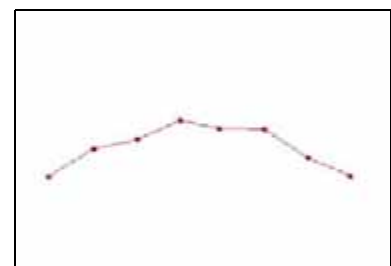
* The *Average* tab has four popup menus for you to choose the *Bin* paths. It allows you to set the values for each animation key of the current path as an average derived from the keys of every chosen path.



1st path

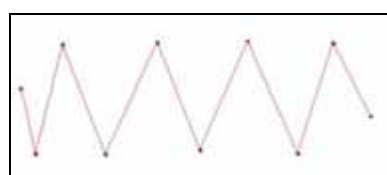
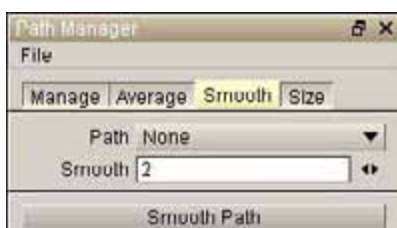


2nd path

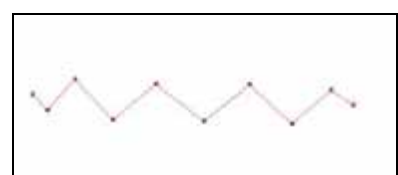


Path average

* The *Smooth* tab allows you to smooth the values associated with the animation key of the path chosen (the higher the numeric value, the more the paths will be smoothed after application).

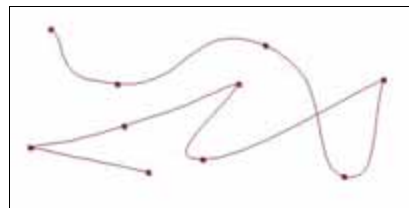
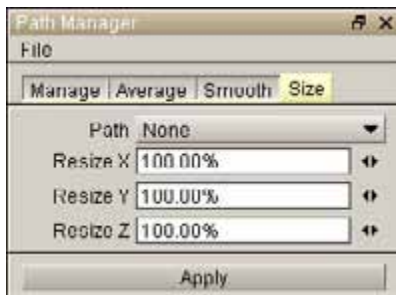


Basic path

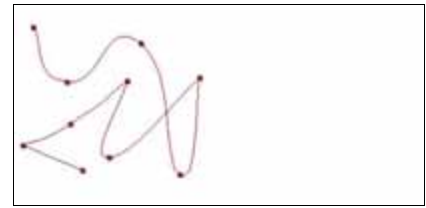


Smoothed path

* The *Size* tab allows you to modify the size of the complete path on each of the three axes (horizontal, vertical or depth). This may be useful if you wish to transfer a path from one project to another with a different size.



Basic path



Path reduced by 50% on the horizontal axis



Using a value of -100% on one of the axes allows to completely flip your path.

To move the entire path on the screen, you simply select all its keys in the *HUD* and then click-slide using the mouse.

Save paths

We explained above that it is possible to save paths to be used later for an effect of your choice (option *Add to Bin*). However, a path saved in this manner may not be recovered after closing and re-opening TVPaint Animation Pro.

Three methods are available to solve this problem:

- * Save your configuration before quitting the program.
- * The effects of the FX stack and their parameters may be saved in a *Bin FX* menu (see lesson 9). This save mode offers the advantage that it also stores the path(s) associated with your effect so that they may be recovered when re-starting TVPaint Animation Pro.



* You may also save your paths before closing TVPaint Animation Pro, then reload them after re-start thanks to the *File* menu of the Path Manager. You can also export a path into *Lightwave Motion* format



The saved path is that of the *Manage* popup menu, a loaded path will be added in the path bin and available in the popup menu of the *Manage* tab.

The *Pixel Tracker*

There is also another way to create paths: follow the movement of the pixels in an animation in time. To do this, you use the *Pixel tracker* panel.

This panel is accessible in the effects requiring use of paths, in the *Tools* popup menu or directly via the *Windows* main menu (see the corresponding window below).

We will now try to create a path from an eye movement of the Running Kid or the blue-screened character. (see below)

When a path is created, we may, for example, re-use it with the *AutoPaint* effect and the pen tool in smooth mode to create a blur on it.

It is also possible to use a lighting effect to create a luminous spot following the movement of Running Kid, etc.



Pixel Tracker with the Running Kid



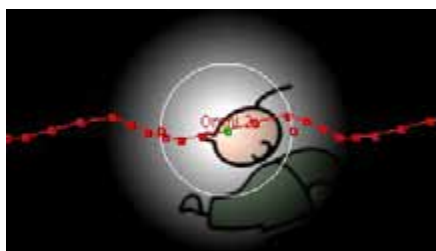
Pixel Tracker with the blue-screened character



original animation



path created from pixel tracking at eye level



Opposite, the path of the eye was re-used with *Omni* lighting.

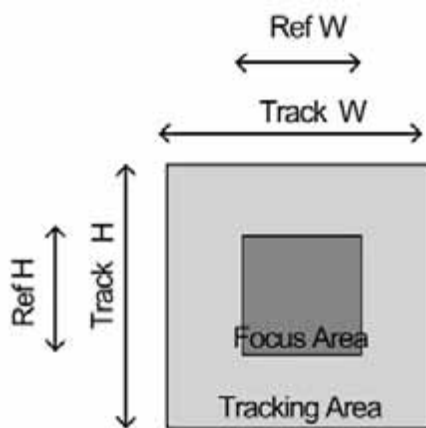
This is how to use the *Pixel Tracker* panel :

* In the first section, you must define the layer on which the character whose movement you wish to follow (or any other element) is located. Two time or frame markers determine the section of the layer that will be taken into account for pixel tracking (the entire layer, by default).

* In the second section, you must define a focus area within the current image. The *Pixel Tracker* will try to find this in the following images of your video in order to create a path. To « follow » a human face, i.e. to create a path from the face, the eye is often used to define the focus area.

The values *Ref X* and *Ref Y* are used to choose the center of this focus area and the values *Ref W* and *Ref H* to set its width and height.

The parameters *Track W* and *Track H* will limit search in the focus area to the number of pixels in length and height of your choice, around the focus area of the first image (see diagram below).



When the *pixel tracker* tool passes from one image to another, it will memorize the focus area of the first image and try to find it in the next image in the tracking area.

This enables creation of the position keys necessary for path creation.



If *HUD* display is enabled after having clicked on the *Set tracker* button, you may modify these parameters directly with the following combination : [Ctrl+right click+slide the mouse] or [Ctrl+left click+slide the mouse].

If, for example, you select the right eye of our blue-screened character as «focus area», and the values for the parameters *Track W* and *Track H* are too small, this will make it difficult to find it in the following images (as our character is moving).

Inversely, high values for these parameters may define the left eye of the character as « focus area » during the process and this will falsify the path obtained.

* The third section contains three popup menus:

The *Reference* popup menu is used to choose if the reference « focus area » for the process is always that of the first image selected or will be updated as tracking progresses.

The *Channel* menu will, depending on your choice, restrict the channels to which analysis of movement tracking will be applied.

The *Accuracy* popup menu allows you to define the complexity of the concordance test. If you choose *1-1*, the test is carried out at pixel level. The tracking is then fairly rough. If you choose *1-64*, the pixels determined by the *1-1* test will be moved 64 times by a 64th of a pixel in order to fine-tune tracking.

* The fourth section is a zoom on the focus area you have selected.

* The fifth section contains two buttons:

The *Track* button starts the process of creating a path with the chosen parameters whereas the *Rev. Track* button has the same effect but reverses the path.

The Motion > Keyframer effect

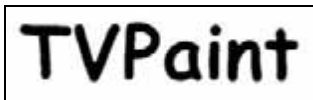
The *Keyframer* is doubtlessly one of the most used effects in TVPaint Animation Pro.

It is found in the *Effect > Motion* main menu.

It is used to move all kinds of drawings on the screen.

To use the *Keyframer*, you must define the following :

- * The object to be moved on the screen: brush, layer, spare image, paper...
- * The path taken by the object on the screen using animation keys or pre-defined paths.
- * The rotations to be applied to this object using keys.
- * The motion blurs and, if required, pre- and post-behavior.



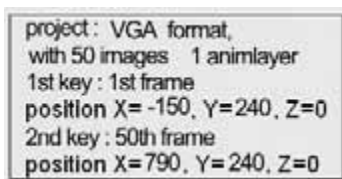
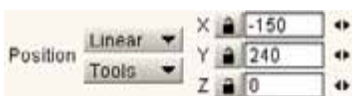
To start our study of the *Keyframer*, we have created a «TVPaint» brush (320*100 pixels) as shown opposite. The word TVPaint is written in black on a transparent background.



In some of the images hereafter, the background chosen is gray so that you can see the white pixels of the HUD.

• 1st example : movement, zoom and motion blur

We will now move the « TVPaint » brush on the screen.



* Go to the *Render* tab and select the *custom brush* as source.

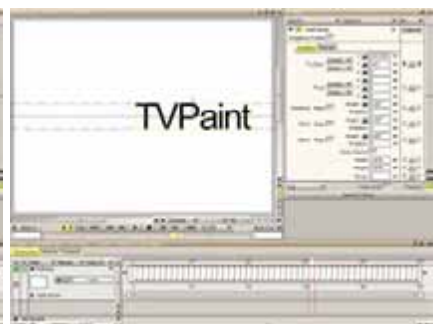
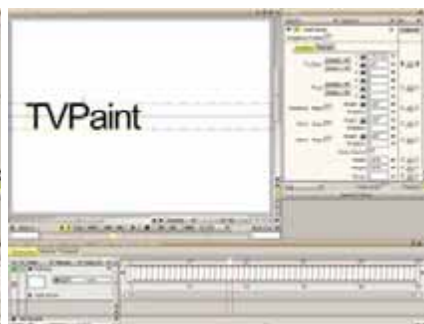
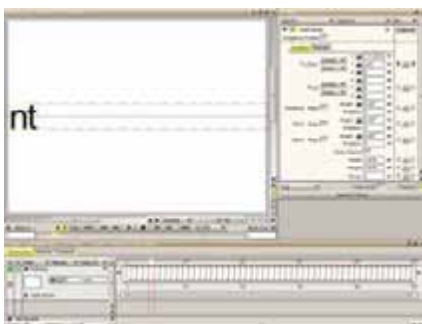
* Go back to the *Position* tab.

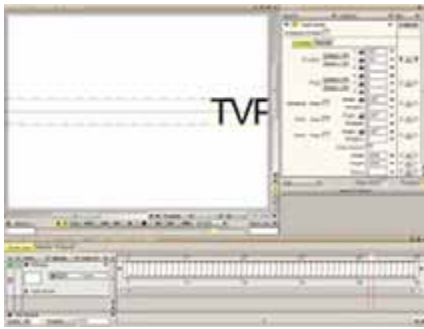
* Place the TVPaint brush outside the current project to the left using the HUD (see below) and then create an animation key for the *position* variable at the beginning of the layer.

* Now create an animation key for the *Position* variable at the end of the layer and place the TVPaint brush outside the current project as before but this time to the right.

* As needed, you may adjust the position of the movement key points using the numeric fields and mini-sliders (use the values shown opposite). The X and Y fields represent the position of the brush center on the screen.

Playing your project in *Preview* mode allows you to check that your brush appears on the left of the screen and disappears to the right.



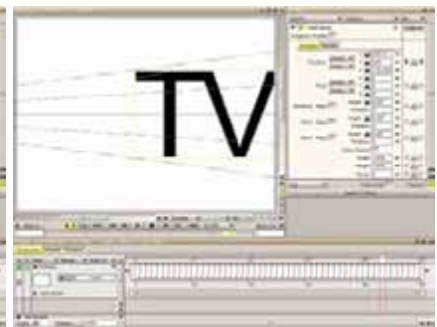
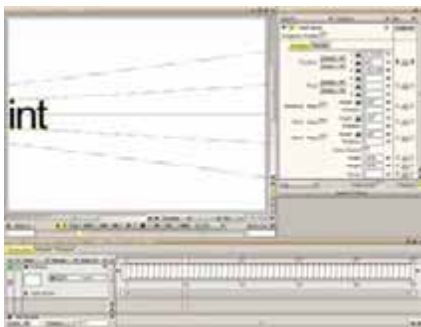


To create a path you may position a brush outside the area zone: the brush then appears hidden and only its outline is visible as *HUD* (see opposite ...).

Do not immediately apply the *FX stack*. Did you notice the *Z position* numeric field? This is used to set the depth of the object moved on the screen.

Let's now modify the second key we created: enter the parameters for the following positions :
X= 540, Y= 240, Z= -800

A fast slide along the timeline allows you to see that our logo moves from left to right but, in addition to that, zooms towards the viewer ! (see below)

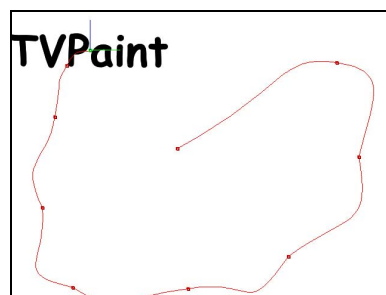


A positive value in the *Z* numeric field would have resulted in the logo moving away.

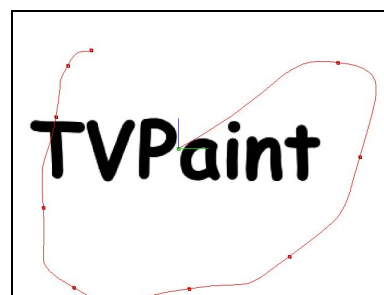
It is possible to generate even more subtle movements as our logo may follow the pre-defined path of our choice thanks to the *Path Recorder* or *Pixel Tracker*.

You may also curve the paths thanks to the *HUD* and the keys of your choice (*Linear*, *Spline* or *Smooth*).

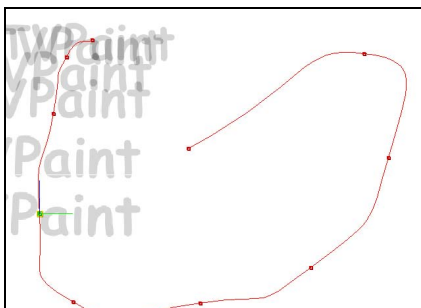
For example, in the trajectory below, the logo follows a spline on the screen while zooming lightly towards the foreground.



>>



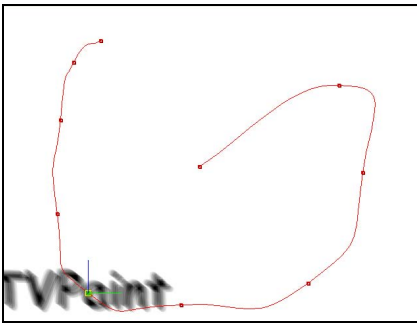
Now we will make it a bit more complicated... It is possible to leave a trail behind our logo, a trail that depends on its speed and trajectory.



Go to the *Render* tab :

the *Blur step* value defines the number of logos which will make up the « trail ».

The *Blur Size* is used to set the parameters of the trail length (see opposite).



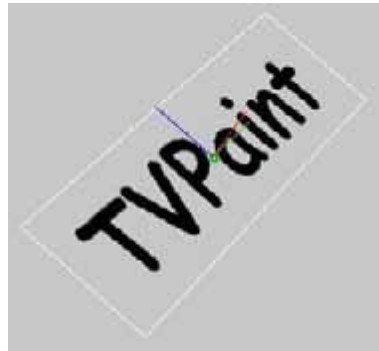
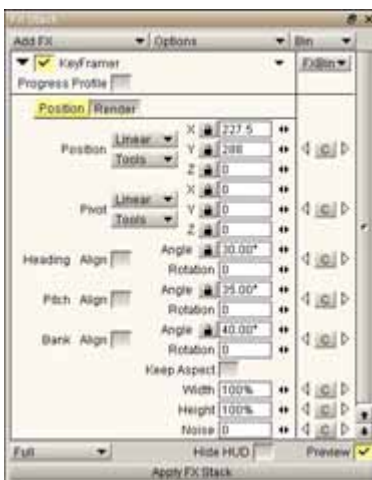
Note that a low value generates a slight blur in the movement direction which is ideal for creating blurs generated by fast object movement.

A zero value will eliminate the trail.



The settings of the progress profile (lesson 9) come into their own here: the movement is accelerated or slowed at your discretion !

• 2nd example: *Pitch, Heading, Bank* and *Pivot*

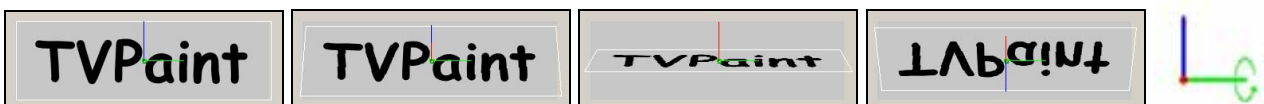


In this second example, we will pivot our «TVPaint» logo using the pitch, heading and bank parameters.

Reset the values of the *Keyframer* effect to zero, select the «TVPaint» logo as source again and modify the *Bank* angle using the slider. The logo then turns along the blue axis represented on the diagram (see below).



Reset the values of the *Keyframer* effect to zero and proceed in the same way with the *Pitch* parameter. The logo now turns along the green axis represented in the diagram.



With the *Heading* parameter, the logo turns along the red axis represented in the diagram.



The combination of these three parameters gives a wide variety of results. It is now up to you to use these rotations in your animations and videos.

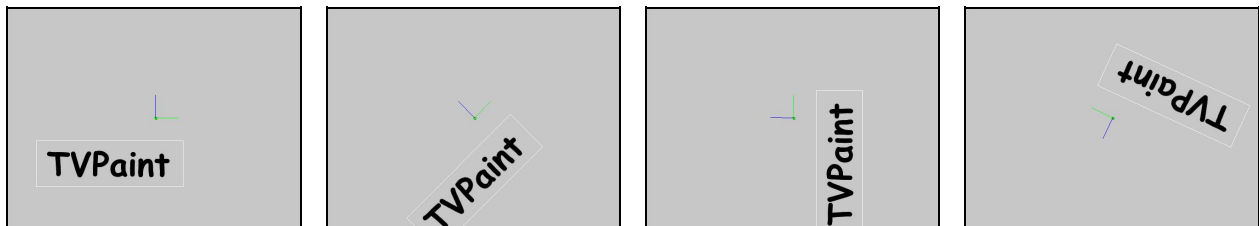
The logo may carry out several rotations around an axis: you simply modify the value of the *Rotation* parameter when creating the animation keys to increase the angle to 360°.

In the examples above, our logo always turns in relation to its center: the axes the logo turns around cross each other in its center.

The *Pivot* parameters may be used to modify the position of the rotation axes in relation to the brush.

Modifying the pivot X coordinate by increasing it by 100 pixels and decreasing the Y coordinate by 100 pixels will generate other types of rotation when modifying *Pitch*, *Heading* and *Bank*, as the rotation axes are outside the logo.

Below you will see the effects of the *Heading* modification for our new pivot.

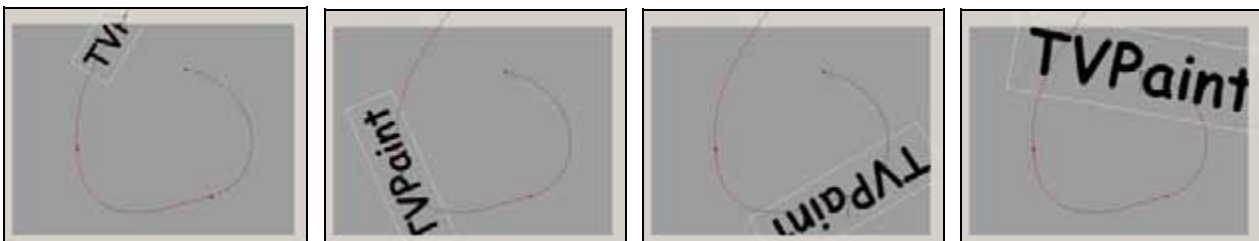


Modifying the Z coordinate of the pivot allows even more complicated 3D movements:



Each of the buttons *Bank Align.*, *Heading Align.*, *Pitch Align.*, when enabled, allows modification of the brush angle depending on the path it follows.

Below: the angle of the *Heading* parameter varies according to the logo trajectory.



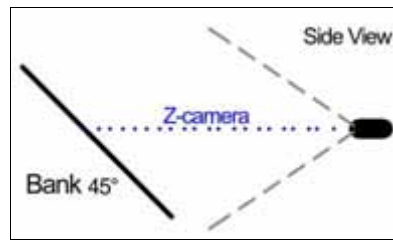
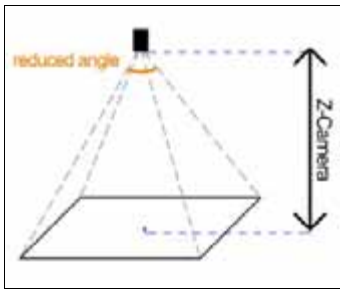
Some words regarding the *Rendering* tab:



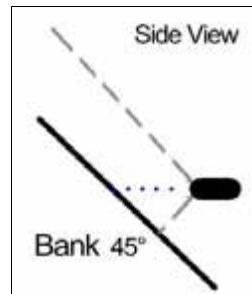
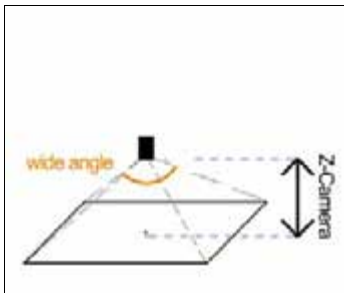
* The *Fill* option is used to fill the screen with the current source. In this case, animating the source will also animate all its copies.

* The *Opacity* parameter is used to adjust logo transparency as time progresses.

* The *Z camera* parameter represents the distance between the « virtual camera » and your image in pixels. The smaller this distance, the larger the opening angle of our « virtual camera ». This enables you to use the « wide angle » effect well known in cameras by using the parameters for *Pitch* and/or *Bank*.



Above, the pitch parameter was set to 45° for our merged image of the tree. The image at the top was obtained with a Z-Camera equal to 1000, the one below with a value of 210.



• 3rd example



This third example will allow us to work with different sources (*Rendering* tab) in the *Keyframer* effect.

Let's go back to our « planet » image used in previous lessons. We'll assume that your cartoon is finished. Now you want to scroll the list of participants in the form of end credits

```
azertyuiop
qsdhijklm wxcvbn,;!
aqwxszedcvrtgb
bgtrhyju;ki:lolmp wxsexdrzqact
mqslskd fightyr eizoap
wxcvhgfd uikjh tazer m.!: etr
ozuyç_âé)345
wxsderrtdfxcvfgtyughvbagjhiu
kj,nlkopml
1246xfjf098765432
qhsjdkflgm yzueirtoyp
kdoapentxidj elmpyut
ijnrdxcde.jy pqmeugfg
zpgvjiry(_ç"578905
wseplk,njuyrbv sfdkfg sziaf
9874213 54987
```

We'll assume that this list is contained in another project much «higher» than the one of your planet (opposite).

Pay attention that the text is written on a transparent background, then select (*Background = None*) in the timeline of this second project.

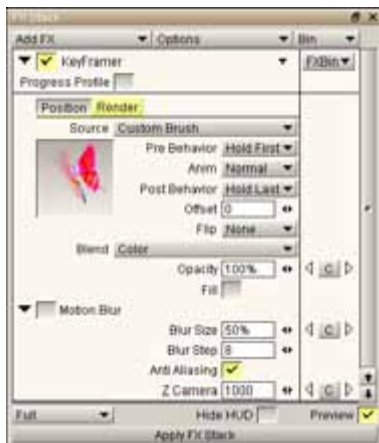
This is how to scroll the list from bottom to top:

- * In the *Rendering* tab, select the *Projects list* as source and then the name of the project containing the list of participants,
- * Place two keys at the beginning and the end of the animation layer with the position parameters close to the illustration on the following page.



* Apply the *FX stack*.

It's done ! ... The list moves from the bottom to the top as intended.



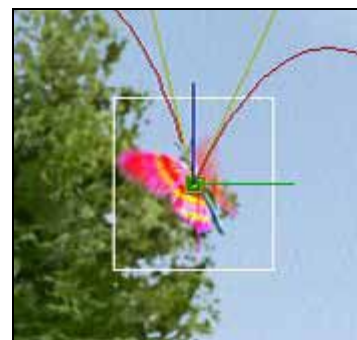
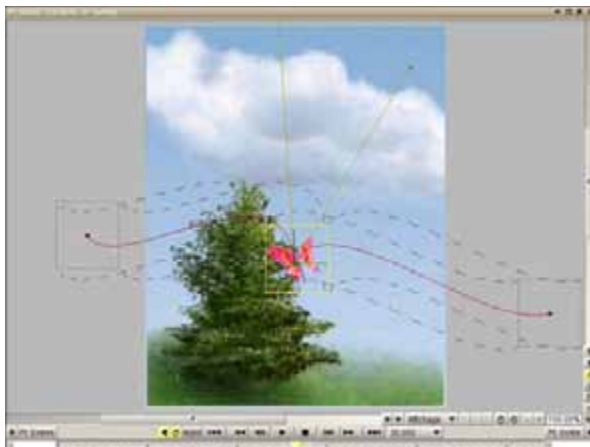
Thanks to the *Keyframer* anything may be moved on the screen: a brush, another project, the layer of your choice, the spare image, the current image, etc...

You simply choose what you want in the *Source* popup menu of the *Rendering* tab.

For example, exchange the current brush with the « butterfly » animated brush in the *Bin* tab.

This animated brush may also be moved as you wish and, why not, follow one of your pre-recorded paths.

Below, our butterfly lands on the tree before flying off again and leaving the screen.



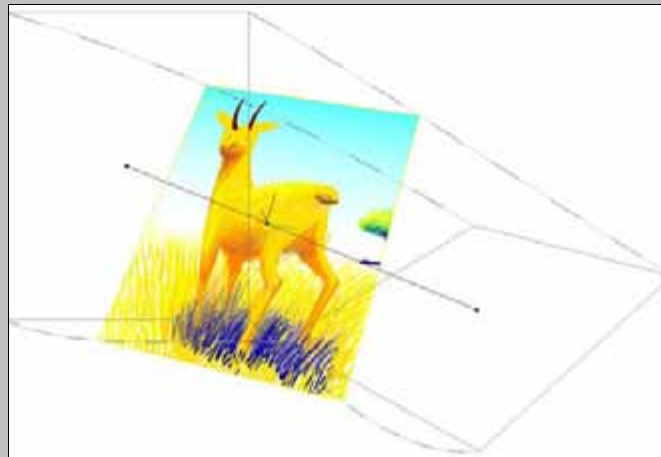
When using animated brushes or animation layers as source images, additional settings will be required. In this case, you have two popup menus at your disposal: *Before* and *After*.

They may be used to define how the images of your animated brush or animation layer would be applied by the *Keyframer* effect if their number were lower than that of the sequence you are working on (application of the brush or animation layer images with *Loop*, *Pingpong*, *Random*, etc.).

For our butterfly we have chosen the *Loop* mode.



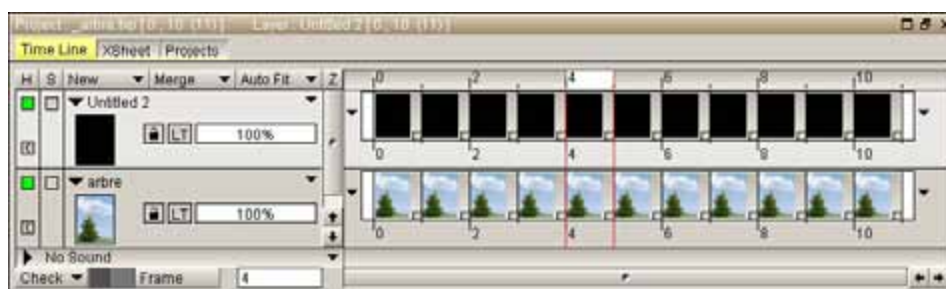
Please note that the H.U.D displays the splines followed by the four corners of the source and also the edges of the first and last frames. (see below)



• 4th example

This example will help you understand the *Blend* menu in the *Rendering* tab. Load the video footage of your choice and then create an animation layer containing only black and opaque frames just in front.

You should then see the following timeline:



Create any type of movement for the object of your choice using the *Keyframer* tool. Here, we are taking a red « TVPaint » logo brush. Its trajectory is of no importance.

Our red logo will, after application of the FX stack, be placed on each black image. So far, nothing new.



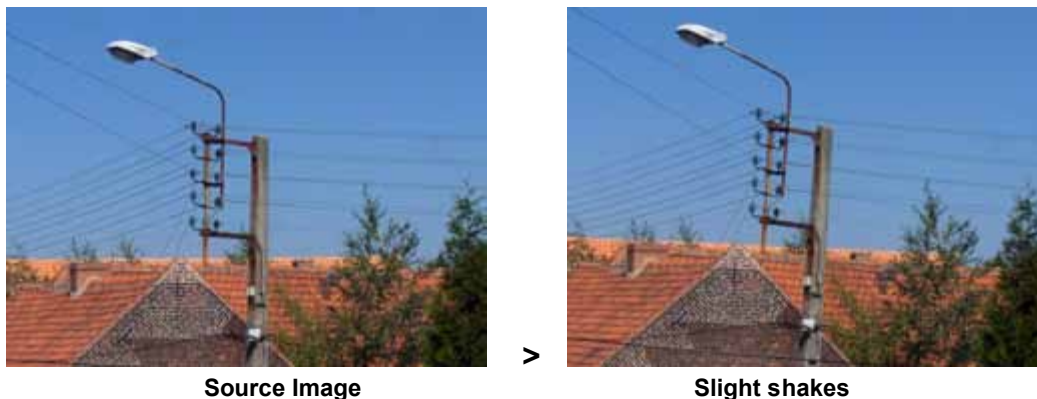
If, before applying the FX stack, you select the *Erase* mode (described in lesson 2) in the *Blend* popup menu (*Rendering* tab) you obtain the result shown opposite.

Our « black » layer was erased at the logo passage areas which made it possible to see the layer underneath.

It is as if our logo had been applied with the *Eraser* color mode. The *Mixer* mode refers to that encountered when using a spare image.

The Motion > Stabilization effects

Imagine that the video sequence you just have loaded is slightly shaking. It's a common situation when you're using cameras fixed to a mobile support, for examples hand-held video footages, video sequences shot on a boat, etc...



It is possible to avoid these undesired shakes by adjusting each images as the sequence goes along. If you proceed image after image it can be quickly tiresome. Fortunately, the *Motion > Stabilization 1 point* and *2 points* effects will take it in charge.

The Motion > Stabilization 1 point effect

This effect works as follows :

For each image from the sequence, you have to define an *Origin point* and a *Destination point*. The effect will make a panning of the image in order to bring the *Origin point* onto the *Destination point*, which will stabilize the sequence.

Now let's take an example :

Let's take the background below : the cameraman has shaken a little bit while shooting the sequence. We can define one of the yellow points below as the *Origin point*, and estimate that this it should be at the position of the *Destination point* (at the extremity of the yellow arrow) if the camera had not shaken.

As soon as these points are defined, the Stabilization effect will do a panning that will bring the *Origin point* onto the *Destination point*. The footage will not shake anymore.



Origin point



Horizontal and Vertical camera movements



Destination point

You can argue that each positions of the *Origin* and of the *Destination* points are different for each image, which make the process tiresome.

That's why, at this stage, using a path for the *Origin* and/or *Destination* points can speed up the process, especially paths created with the *Pixel Tracker*...



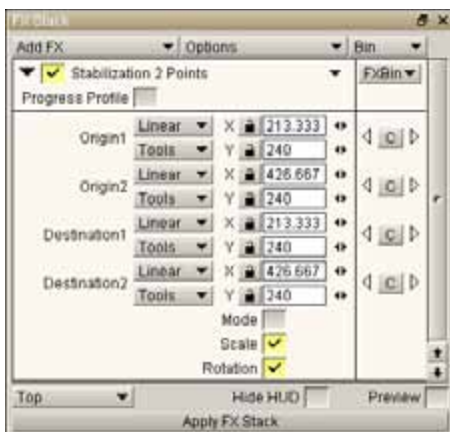
As soon as the effect is applied and that the image is stabilized, you could have to crop it to remove the white borders due to possible pannings. You can also use the *fill* button to remove the borders by tiling the image.

The Motion > Stabilization 2 points effect

This effect is similar to the previous one regarding its principle and its working. However it requires two *Origin points* and two *Destination points*.

The *Stabilization 1 point* permitted to adjust horizontal and vertical camera shakes.

Using the *Stabilization 2 points* tends to fix not only the shakes on X and Y axis, but also the slight rotation or zoom movements there can be on Z axis (The effect considers the distance and the angle between the *Origin points* which improve the process and make it more efficient...).



Below, the cameraman has rotated a little bit the camera while shooting the sequence.

If you define two origin and two destination points in the *Motion > Stabilisation 2 points* effect and check the *Rotation* box, the effect will then calculate the x° rotation angle of the image and makes the *Source* and *Destination* points coincide. (see below at the extremity of the arrows)



2 Origin points



Rotation moves of the camera



2 Destination points

If the camera has zoomed a little bit while the sequence was recorded, you will have to use the same process and check the *Scale* button.

As we did for the effect *Motion > Stabilisation 1 point*, you can check the *fill* button to remove the borders by tiling the image.

Lesson 15

The *Rendering* > *Multiplane Camera* Effect

In this lesson, you will :

- Study the concept of a *Multiplane Camera*.
- Learn how to use the *Multiplane Camera* effect (we will discuss various examples).

The concept

With the multi plane camera effect you may control movement of several planes with background scenery. Each plane has a specific depth and consequently, its own speed in the eyes of the observer.



In the image above, the following are placed one over the other in the order of furthest away to closest:
the starry sky, the mountains, the forest, the first row of trees, the running kid and finally the second row of trees much closer.

When the animation is complete:

- * The trees in the front will move from right to left very quickly as they are closer to the viewer.
- * The mountains at the back will also move from right to left, but much slower.

The blur caused by focusing

This effect can also take into account the fact that the human eye cannot focus on all elements of the scenery at the same time.

Just like in traditional photography, if you focus on a object close to you, the objects further away will be blurred and vice versa focusing on a distant object will result in blurring of closer objects.

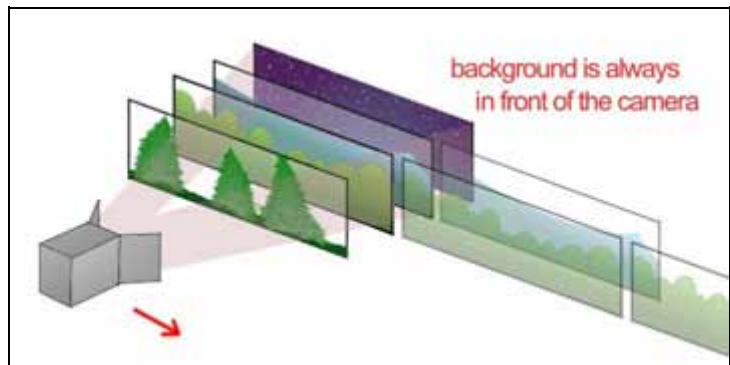
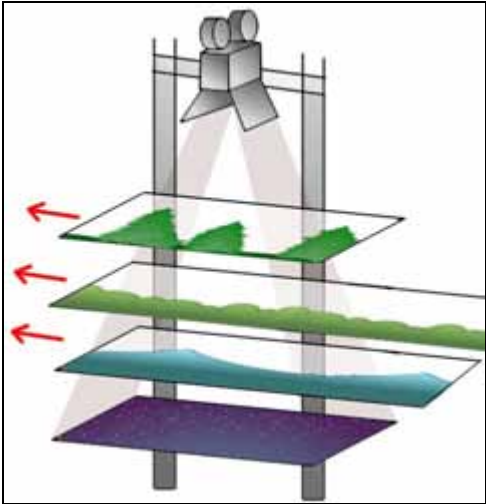


In the photos above, the tree is a long way from the rose. In the left photo, the camera has focused on the rose and the tree is blurred. In the right photo, the camera has focused on the tree and the rose is therefore blurred.

Editing table and computer multiplane camera

Below on the left you will see the schematic diagram of a traditional multiplane camera setup often referred to as editing table. Each plane is placed on a sheet of glass and is moved progressively while filming.

Our computer multi plane camera effect, seen below right, does not function in the same way: In this case, it is the camera which moves progressively while filming and the scenery is automatically duplicated horizontally (the starry sky background does not move and is always placed in front of the virtual camera).



The project used in this chapter

The drawing shown on the previous page corresponds to the MPC.tvp project which will be taken as a basis to study the multi plane camera effect.

Here, you have the corresponding timeline:



Layer where the effect is applied

Layer «character»

Layer «distant trees» (near)

Layer «distant trees» (far)

Layer «forest»

Layer «mountain»

Layers «sky» and «stars» which do not move

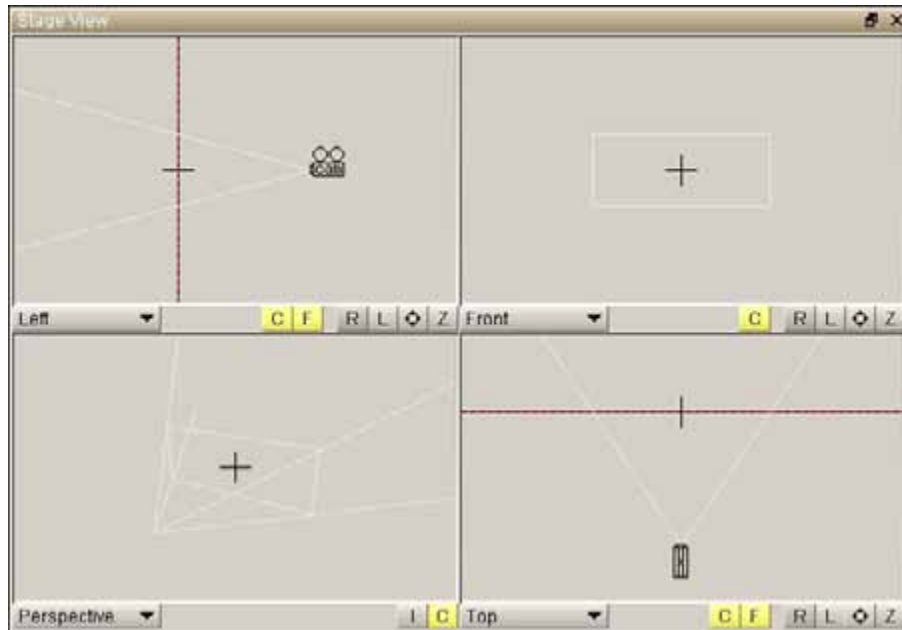
The layers «mountain», «forest», «distant trees 1», «distant trees 2» and «character» will be used to reproduce the desired animation.

3D views

This effect has an *Open stage* button which allows you to view the multiplane camera from various angles. These 3D views will make adjustment of settings much easier.

The default settings are as follows:

- * A perspective view (window bottom left)
- * A left side view (window top left)
- * A front view (window top right)
- * A top view (window bottom right)



The following buttons are available in each panel to simplify viewing:

- * The **Z** button allows you to zoom with a click and slide on the left mouse button. (shortcut : [alt + right click] + move your mouse.)
- * The **I** button is used for panning with a click and slide on the left mouse button. (shortcut : [alt + left click] + move your mouse.)
- * The **L** button when selected, ensures the zoom and panning options are only applied to the current view.
- * The **R** button is used to reset the view to its default values.
- * The **C** button displays the camera and the «viewing angle»
- * The **F** button displays the focusing plane. In other words, the plane on which the image is focused. This plane is seen as a red dotted line in the left and top views. The focusing plane is also visible in the perspective and front views in the form of a gray rectangle. This will be studied in greater detail at the end of this lesson.
- * The **I** button displays all the planes in the perspective view. (see page #10)

The popup menus of each window allow you to customize your viewing options: left, right, top, bottom, front, back, camera and perspective.



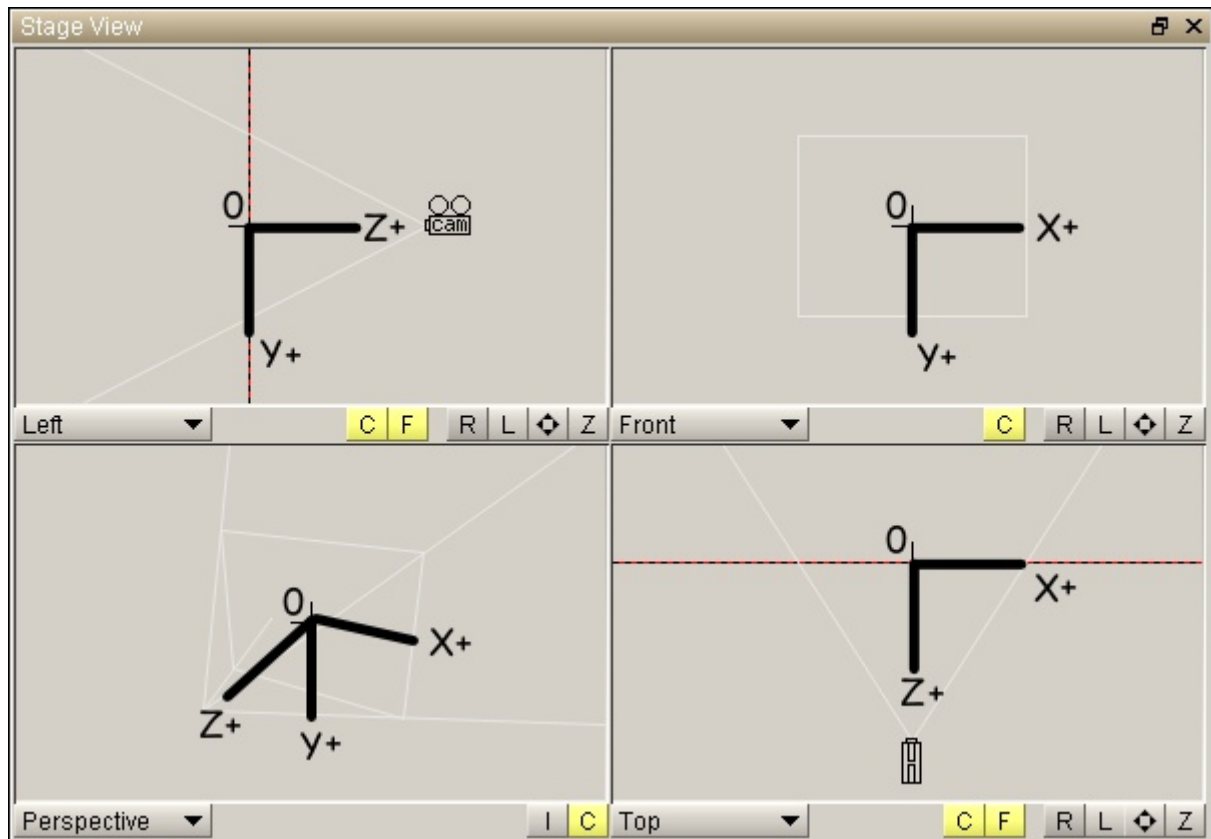
The front and back views are not in perspective. If you choose to use them, remember that you are viewing the various planes «orthogonally projected» on the Oxy plane (see next page).

Positioning in space

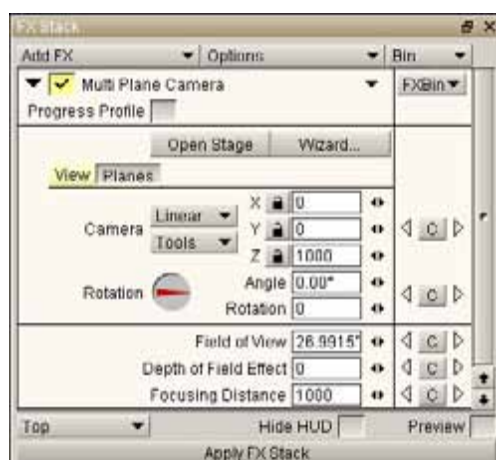
Of course, we will not be working in the same way as with a 3D software, but it is still important to know your position in space when working with this effect.

Compliant with the diagram below :

- * The crosses visible on the 3D view represent the coordinate point ($X=0, Y=0, Z=0$) which will be used as our reference point when positioning our camera and objects (mountain, forest, etc.).
- * The indications $X+$, $Y+$ and $Z+$ indicate the direction of the orientation of the camera in space.



The View tab

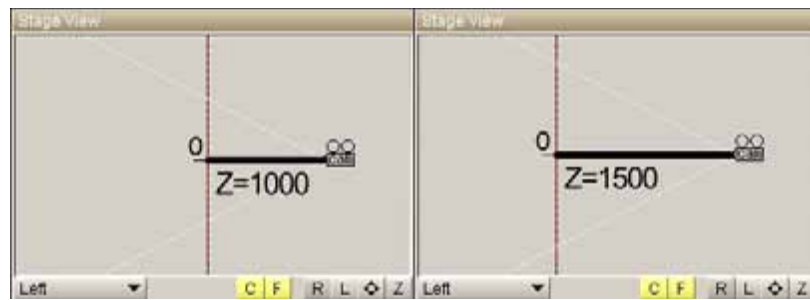


The multiplane camera effect has two tabs:

- * The *View* tab relative to the camera and its setting parameters
- * The *Planes* tab relative to superimposed planes making up the final animation.

The coordinates X , Y and Z of the *Camera* are in fact the coordinates of the virtual camera filming our scene in accordance with the space dimension described in the chapter above.

If, for example, you change the Z coordinate from 1000 to 1500 units using the mini-slider, the center of the camera will be moved further away and the image you see will be changed accordingly.



It is possible to move the camera directly from the window of your choice in the 3D viewing mode: simply click and slide with the left mouse button on the gray line or on the camera icon.

* The *Angle* and *Rotation* parameters rotate the camera around the Z axis (To simplify matters, these two parameters are not taken into account in the 3D view).



* The *Field of view* parameter represents the camera viewing angle. The wider the angle, the greater the number of objects illustrated on the screen.



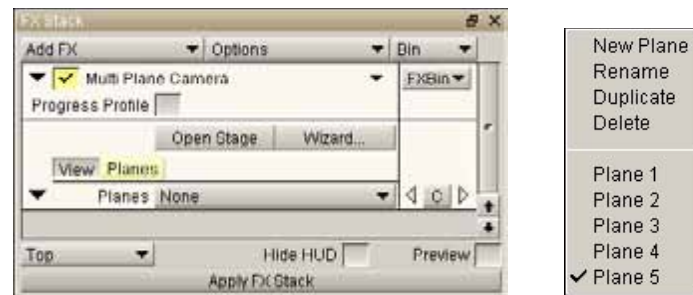
Wide field of view

Narrow field of view

* The *Depth of Field* effect and *Focusing Distance* parameters will be discussed at the end of this lesson.

The *Planes* tab

Now that you have placed your camera in space and chosen a viewing angle, we will now place our planes one at a time using the *Planes* tab. If you have not used the Wizard, this tab is empty.



The *Planes* popup menu is used to create, rename, duplicate or delete planes. The header of this menu contains the name of the plane for which the options are displayed in the panel.

Create an animation with the multiplane camera effect, part 1

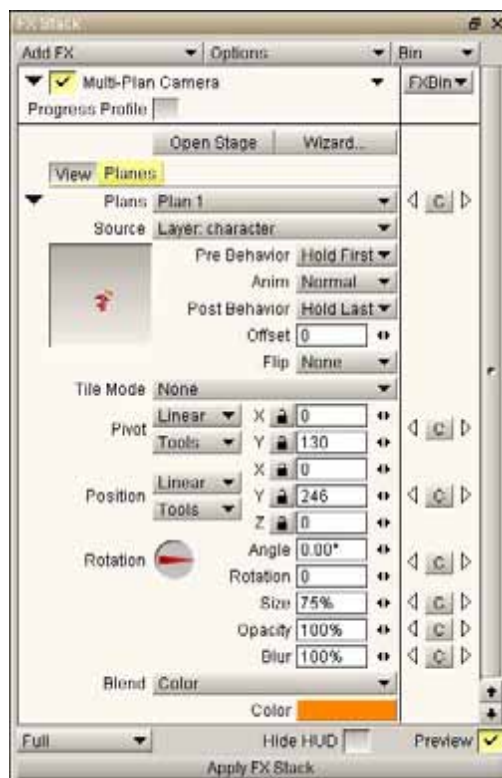
- * Begin by loading the project «MPC.tvp»
- * Go to the «multi plane camera» layer
- * Open the FX stack and delete its content
- * Select the *Multi plane camera* effect in the *Add FX* menu

In the *View* tab :

- * Set the camera position parameter to (X=0, Y=0, Z=1000) and leave the angle at 0°
- * Select a *field of view* of 30°, a *Depth of Field* effect 0 and *focusing distance* 1000.

In the *Planes* tab :

- * Create a new plane and name it «character». A panel similar to that indicated below will appear.



At this point, you must:

- * Choose a *Source* image to create the plane.

As was the case for the *Keyframer* effect, the source may be of various types (project, layer, paper, spare image, etc...) and you may set the pre-, post- behavior, animation mode settings, etc...

We will select the «running kid» layer for our project.

- * Choose a tile mode: Choose « none » in tile mode for our running kid.

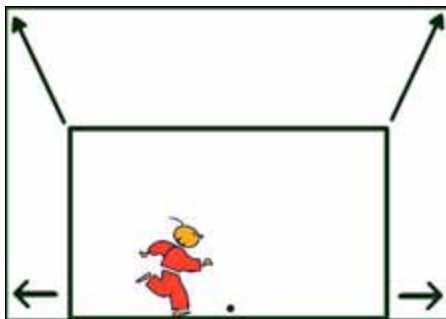
- * Set the *Pivot* and *Position* parameters. These parameters have the same functions as those discussed in the *Keyframer* effect, but don't worry, we will be taking another close look at them.

The *Position*, *Pivot* and *Size* parameters

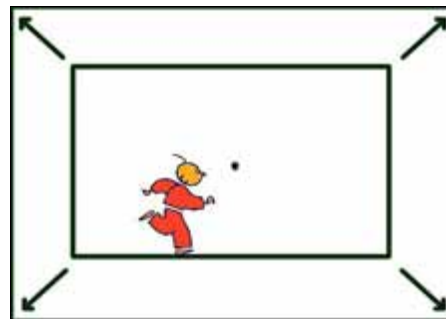
* When the *Pivot* parameter is zero, the *Position* parameter represents the distance between the coordinate point ($X=0$, $Y=0$ and $Z=0$) and the center of the source image chosen.



* The *Pivot* parameter allows you to use a reference point other than the center of the source image to adjust the position and size of your plane. This is very useful when you decide to modify the *Size* of your source image: *Size* modifications use this pivot point as origin point (below in orange).



Increase a plane's size with pivot at bottom



Increase a plane's size with pivot centered

Once you have understood this concept, positioning planes becomes much easier. All you have to do is:

- * Position your pivot,
- * Place your plane at the bottom of your project,
- * Adjust the size of your plane.

Let's go back to our «running kid» plane and apply the aforementioned procedure using the following settings:

- * *Position* parameters : $X=0$, $Y=246$, $Z=0$
- * *Pivot* parameters : $X=0$, $Y=130$
- * *Size* parameters: 75% of initial size

Create an animation with the multi plane camera effect, part 2

* Now that your position, pivot and size parameters are correctly set, you may, if you wish, modify the angle and opacity of your plane as well as adjust the blur to be created with the focusing parameter (we will discuss this again later).

It is also possible to select a color mode to be used for drawing the plane (color, tint, add, screen, etc...).

For our «running kid» plane, we have chosen *Angle* zero, *Size* 75%, *Opacity* 100% and *Blur* 100%. The *Blend* mode is *Color*.

* The *HUD color* box allows you to choose the *HUD* color for the current plane. This will help avoid any confusion when several planes are present on the screen (we have chosen a reddish orange color for our «running kid» plane).

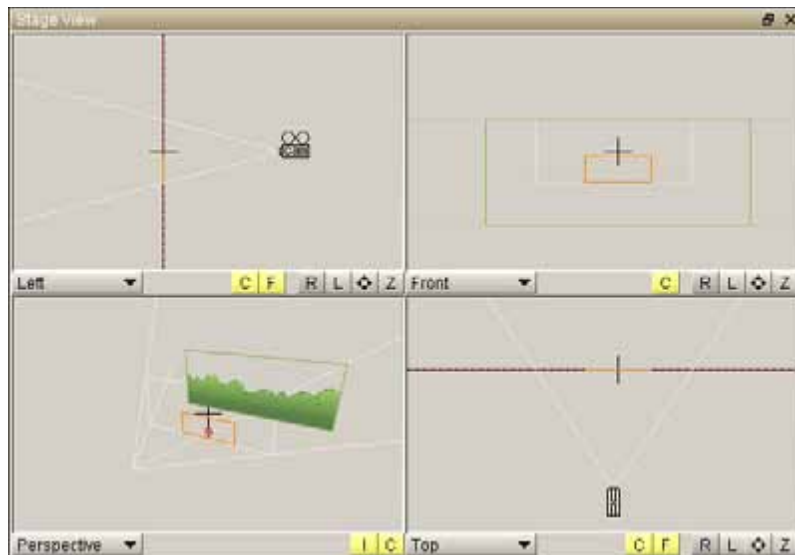
Create an animation with the multiplane camera effect, part 3

We just created our first plane named «running kid».

We will now create a second plane «deeper» than the first. To do this:

- * Create a new plane and name it «forest».
- * Choose the «forest» layer of our project as source.
- * Our plane shows the forest located behind the running kid. We must therefore give it a position value $Z < 0$ (as our «running kid» plane also has the position value $Z = 0$). In this case we choose $Z = -1500$.

The 3D view is adapted immediately: You will notice that the «forest» plane is green (or any other color you may have chosen previously) and «character» plane is orange.



- * You may now adjust the Pivot parameter ($X = 0$, $Y = 210$) and the remaining position parameters ($X = 0$, $Y = 850$). The plane must then be «stuck to the ground»

- * All that is left is to choose the Size (300%).

The «forest» layer was created with the *Panning* tool in the main panel (refer to lesson 7 for further details). You may therefore duplicate it horizontally to avoid having to create too many planes. To do this ...

- * Use the *Tile mode* popup menu.



Without tile mode



With horizontal tile mode

Now that the second plane has been created, all that remains to be done is create the remaining planes in the same way: «close trees», «distant trees», «mountain», with the only difference being that the «close trees» plane will have a Z value greater than 0.



If necessary, the FX stack corresponding to the parameters we wish to obtain is attached to the MPC.tvp project. You must therefore close it and load it again in order to go to the next stage quicker.

Creating movement: move the camera



Now everything is ready to move the camera and obtain the desired result.
To do this:

- * Return to the *View* tab,
- * Go to the first frame of the «multiplane camera» layer in the timeline,
- * Create an animation key for the *Camera* value with $X = -700$,
- * Go to the last frame of the «multi plane camera» layer in the timeline,
- * Create an animation key for the *Camera* value with $X = +700$,
- * Use the *Play* button in your project window to view the result.

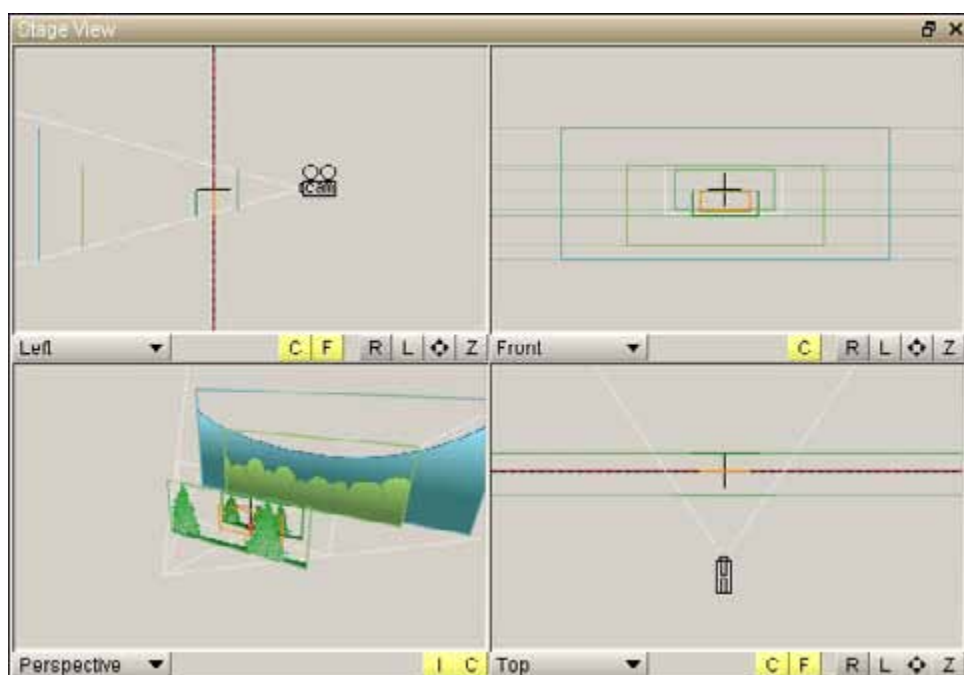
That's it!



Do not confuse camera movement and possible changes in the position of your planes.

The use of animation keys with plane position parameters is only useful if the latter effectively move (if the camera is fixed: mountain, forest and trees are fixed). In such a case, this method would be justified if we had created an additional plane to illustrate movement of the moon in the sky (if the camera is fixed: the moon still makes an arc across the starry sky).

Create and manage focusing blurs



During our animation, all the planes seen in the 3D view on the previous page are in focus.

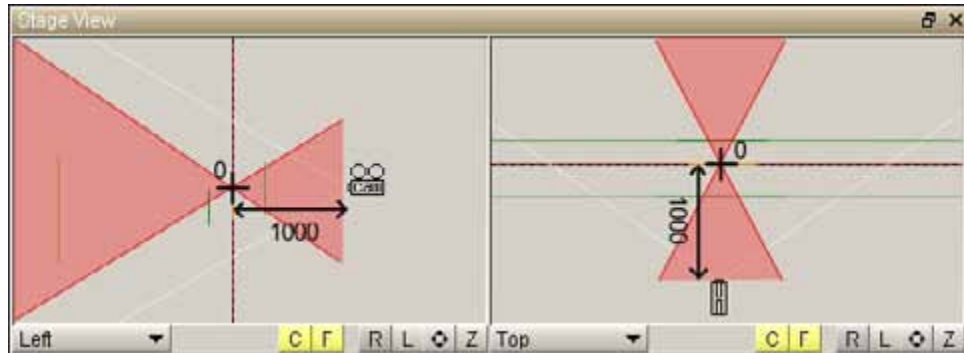
However, to create a more realistic effect, you may wish to create a camera focusing blur effect (refer to page 2 of this lesson, section *Focusing blur*).

You will therefore have to go back to the *View* tab and adjust the *Focusing distance* (i.e. indicate at exactly what distance the camera will be focused).

If you have followed all the steps of this lesson, your running kid will be at a distance of 1000 units from the camera and your focusing distance is also 1000 units.

The running kid is therefore in focus. In order to blur the other elements (mountain, forest, trees...), the *Depth of Field* parameter will need to be increased (when at 0, no blur is applied).

This is illustrated by the creation of a red cone in the 3D view (see below) and a blur on the screen.



The further the objects are away from the apex of the cone, the more blurred they will be. Inversely, the closer they are to the apex of the cone, the slighter the blur will be.



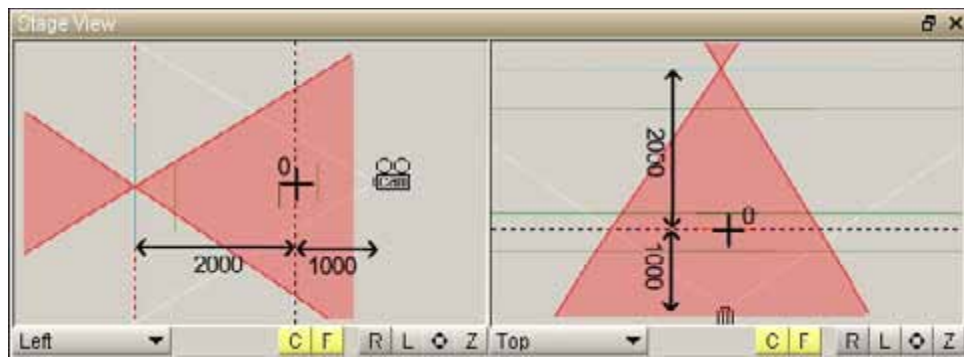
If your focusing distance is now 3000, your camera is located at 1000 units from the center point and the mountains are 2000 units on the other side of the center point ($1000+2000=3000$), the mountains will be focused and the other planes will be blurred.

Considering the position of the cone in the 3D diagram, it is also safe to say that the closer the camera comes, the more the image will be blurred (see next page).



The focusing plane is also visible in the perspective view and in the front view in the form of a gray rectangle.

In the case of the perspective view, you will see a gray «viewing angle» at the focusing distance.



In the diagram above, the blur is applied to your plane either inside or outside the red cone. The width of the cone only indicates the blur amount.



The *Blur* parameter present on each plane of the *Plane* tab is used to adjust the blur for each plane individually. It is expressed as a percentage of the blur generated by the *Depth of field effect* parameter.

Make the kid run

Now that the various elements of our scenery move correctly and the focusing blur has been adjusted, we may, for example, decide to move our red running kid using another animated source at the «running kid» plane level.

* You may choose to use the «Running_Kid_1.tvp» sequence studied in lesson 6 by modifying the position parameters of the «running kid» plane using animation keys (in this case he is not running on the spot).

* You may also use the «Running_Kid_2.tvp» project studied in the same lesson (*). In this case, you will probably not need to modify the position parameters with animation keys as the running kid moves from left to right.

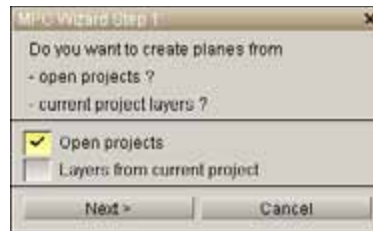
(*) This project was created using the *Keyframer* effect with the «Running_Kid_1.tvp» sequence as source.

The multiplane camera wizard

You have certainly noticed the  button to the right of the *Open stage* button. This button will help you quickly place the various planes in order to create a sequence using the

Multiplane camera effect. Naturally, it was important to first study the global functions offered by this effect before introducing you to the latter function.

So now click on the *Wizard* button. The window which then opens asks if *Wizard* should create planes using external projects or from the layers of the current project. These are the 2 most common cases.



Create planes from projects

Choosing option 1 implies that you have first opened the projects you wish to use for the planes of your animation. Ensure the projects you intend to use are open before validating this window. Once validated, each project will become a plane in our *Multiplane camera* effect. The next window to appear invites you to stage these planes. This staging may be adapted to meet your specific needs.

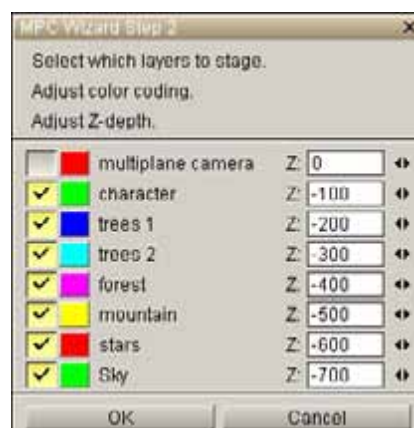
This is how the window looks:

The animation plane is created as the first plane and the other planes are listed in a column below it. Each plane has a check box which allows you to choose whether or not this plane should be used in your animation. The planes order is inverted compared to the order in which you opened your projects (the last project opened is the first plane, the first project opened will be the last plane). You will have noticed that each plane has a Z axis position value. With the default settings, each plane is given a Z value which is a multiple of -100: 0 for the first plane, -100 for the second, -200 for the third, etc... Therefore, all you have to do is define the Z values for each plane as you require and then validate your choice. All your planes will then be incorporated into the effect with the Z values defined above and all that remains is for you to animate them.

Create planes from the layers of your current project

Assuming the project MPC.tvp supplied on the CD is open, check the «layers from current project» box and then validate your choice.

The *Wizard* will then take each of the layers of the current project and incorporate them in each layer as a plane. The planes staging window, corresponding to stage 2, appears and displays each layer with the associated Z value:



In this window, you have the possibility to define whether or not each plane is to be enabled together with the customized Z axis position value (or not) for each plane.

You may also modify the HUD color.

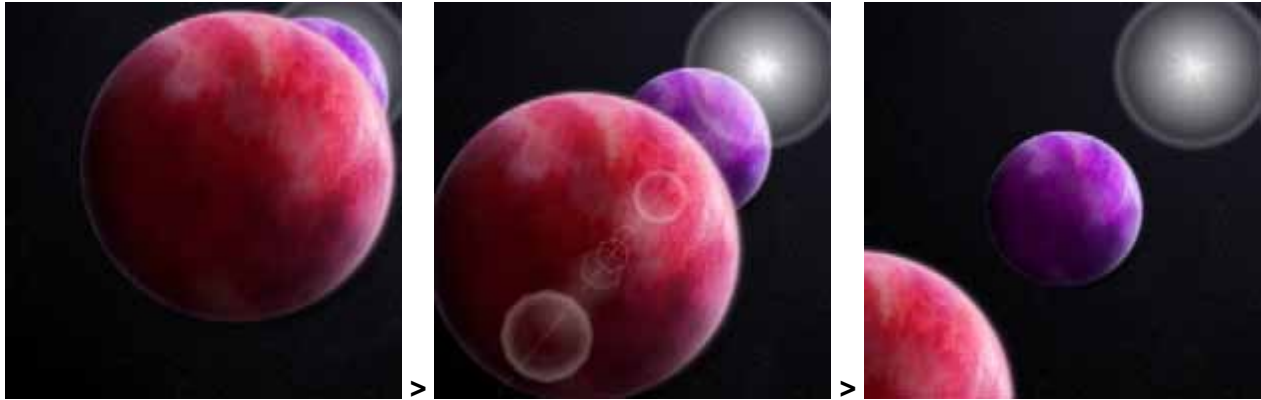
Now all that remains is to click on **OK** and the *Wizard* will automatically create all your planes using the layers.

Other situations

We have now learned how to use the multi plane camera effect with a simple example.

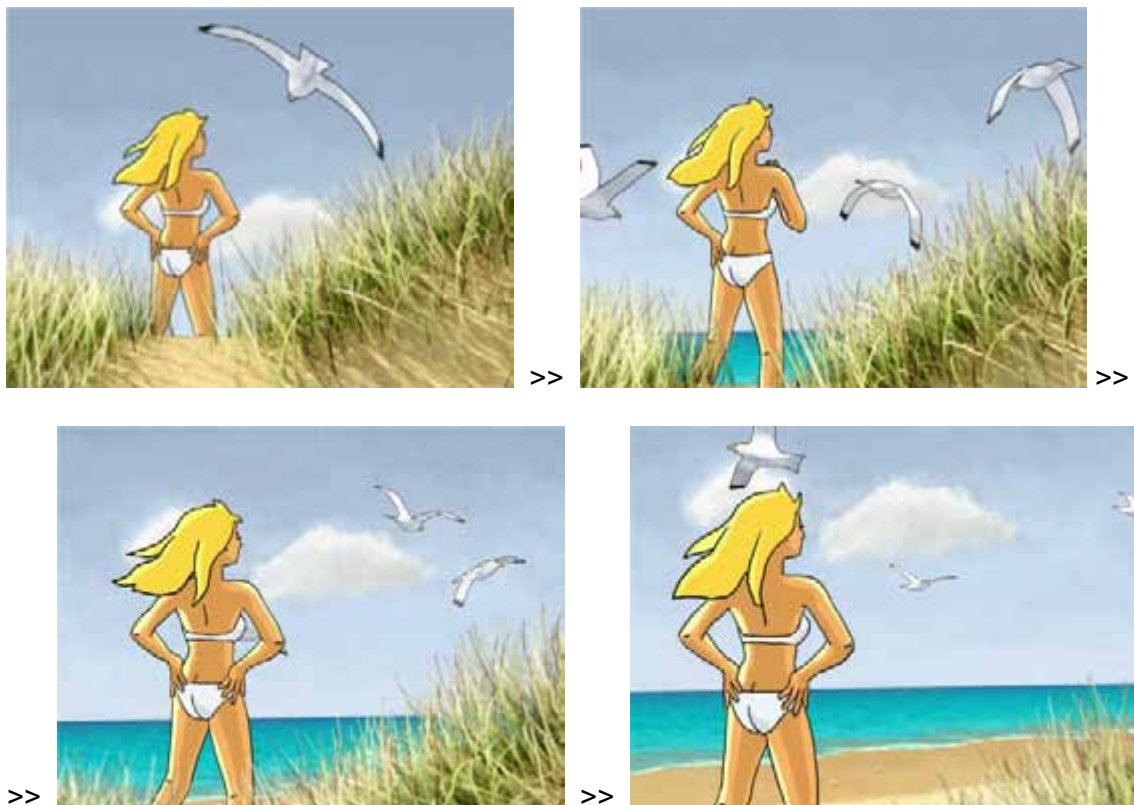
Our *Multiplane camera* effect may also be used in other situations:

Below you will see the transversal movement of the two planets with a fixed sun and *Lens Flare* effect (it will be studied in the next lesson).



The multiplane camera can also be used to zoom between the planes you have created :

- * After you have created the planes with the wizard, go in the *View* tab and on the first frame of the «multi plane camera» layer in the timeline.
- * Create an animation key for the *Camera* with a negative value for the Z axis.
- * Go to the last frame of the «multi plane camera» layer in the timeline, create another animation key for the *Camera* with a positive value for the Z axis,
- * Apply the FX-Stack to the whole layer.
- * Use the *Play* button in your project window to view the result : the first planes should disappear smoothly as shown in the exemple below.



Now you try it!

Lesson 16

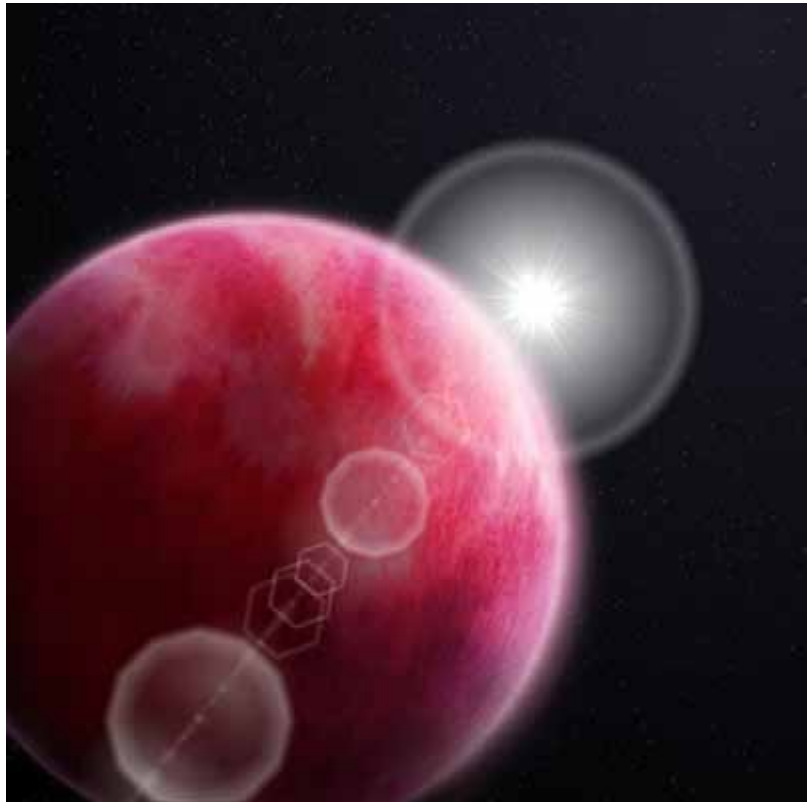
The effects of the *Rendering* group

In this lesson, you will:

- Study the rendering effects relative to the light : *Lens-Flare*, *Volumetric Light*, *Healing Tracker*, ...
- Study the rendering effects relative to the text : *Simple text*, *Multiline text*, *Time Code Generator*, ...

Note : The *Particle Generator* effect will be the main subject of the 17th lesson.

The *Rendering* > *Lens Flare* effect



The *Lens Flare* is an over-illumination effect seen through an optical lens. Generally encountered in the world of photography, it occurs when the image framed is excessively illuminated and when a non adequate lens is used. Several types of lens flare are encountered: ring, streaks, circles, ... They are located along the straight line from the light source to the camera lens used. Sometimes the lens-flare effect obtained takes the shape of blades used as the lens diaphragm (see drawing below).



Diagram of a camera with a 6-blade diaphragm



Examples of the resulting *Lens Flare* effect (hexagonal effects)



Photo with a true *Lens Flare* effect

The larger the lens, the more the *Lens Flares* will be visible and the size is proportional to this lens (when using the zoom, for example).

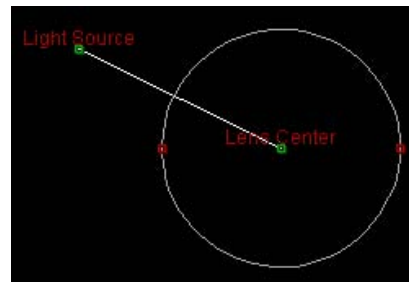
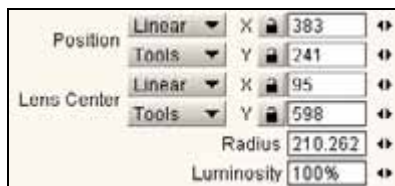
We will now take a closer look at the various options proposed for this effect in order to allow you to obtain results similar to those illustrated in the image above.

When you choose the *Lens-Flare* effect in the *Rendering* effects menu, the first parameter to be entered is the *Position* of the light source and the lens.
The first four numeric fields are used to adjust these positions.

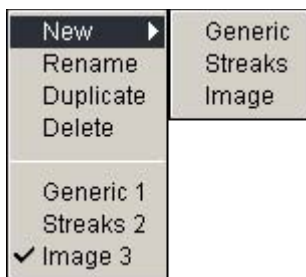
The *Lens radius* is measured in pixels and is used as a reference for the size of future light interference effects you wish to create (ring, streaks, circles...).
The *Luminosity* parameter controls the luminosity of all light interference visible on the screen.



The position of the light source, lens and lens radius may also be adjusted with the HUD



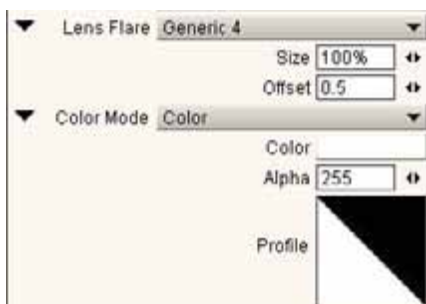
The *Lens Flare* popup menu creates various types of lens flare effects: they may be of the *Generic*, *Streaks* or *Image* type.
It is also possible to rename, duplicate or delete these effects at your convenience.



Once a type of lens flare has been created, its name appears in the *Lens Flare* popup menu.

In the header of this menu you will find the name of the lens flare the parameters of which are visible on the screen.

• *Lens Flares* of the *generic* type



Here are the various *Lens Flare* parameters of the generic type.

You may:

- Change the *Size* of the *Lens Flare*: this value is a percentage of the lens size (the size that you have implicitly chosen when setting the lens radius).
- Change the *Offset* of the *Lens Flare* : in other words, modify the position of the lens flare in relation to the center of the lens and light source.

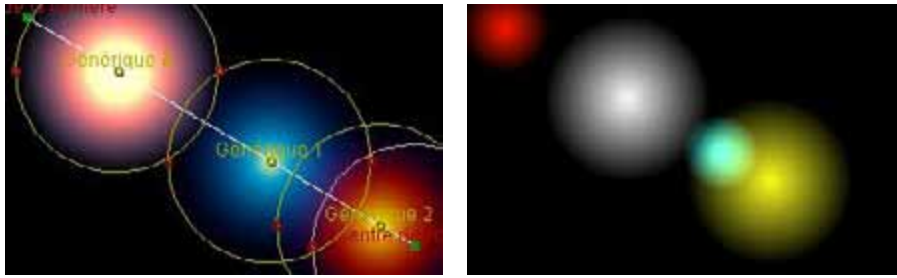
An offset of 0 places your *Lens Flare* at the same level as the light source.

An offset of 1 places the effect at the same level as the lens center.

An offset of 0.5 places your *Lens Flare* in the middle of the two aforementioned points.

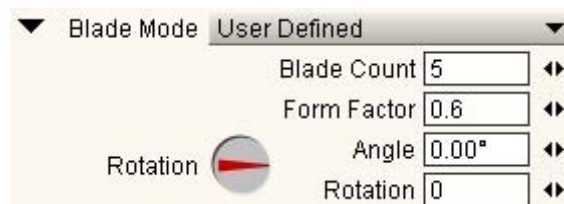
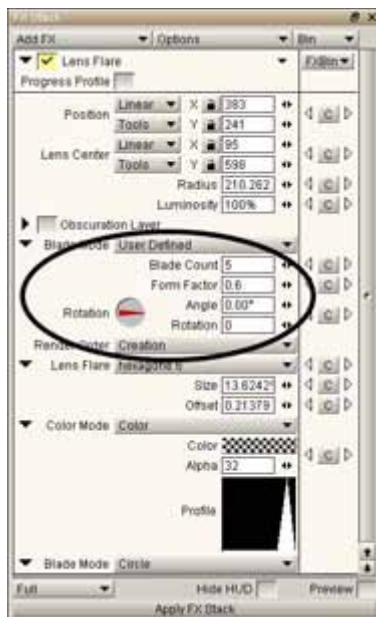
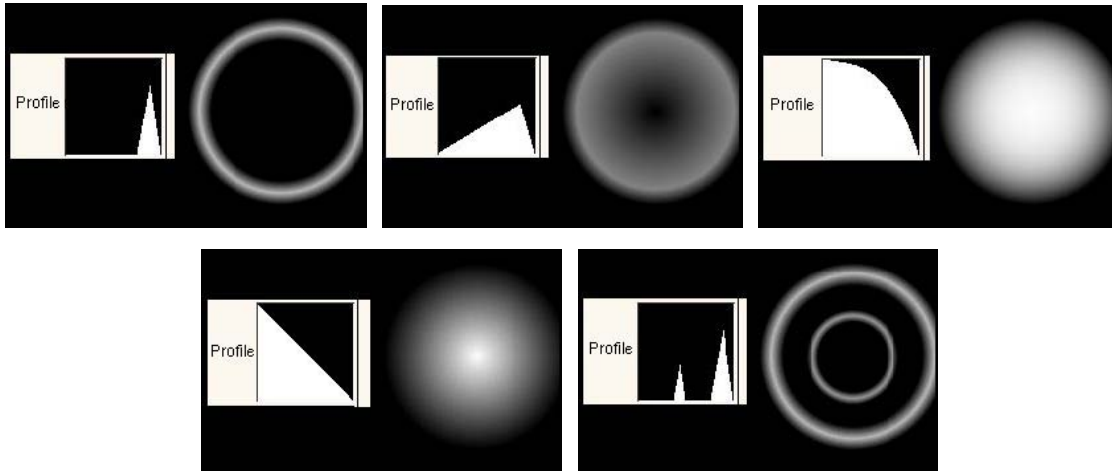
It is also possible to use a negative offset or an offset greater than 1.

- Choose single-color or gradient color artifacts (see below).



- Modify the profile of your artifact using the profile curve.

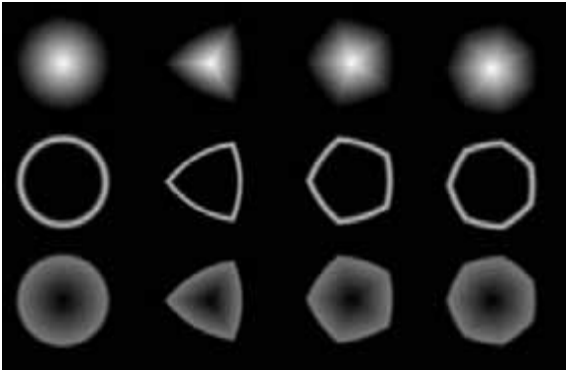
This effect is constructed in the same way as we have already seen in lesson 2. Correctly setting the profile parameters is essential if exceptional results are to be obtained (see examples below).



The *Blade mode* indicated above enables adjustment of all *Lens Flares* of the *generic* type according to the diaphragm blades of your virtual camera (see diagrams on page 2 of this lesson). It is very important to set its parameters correctly if realistic results are to be obtained.

You may choose a *Blade mode* of the *Circle* type (images above) or a user defined *Blade mode* (see next page).

- You may choose the *Blade count* for your virtual camera lens (see examples below, based on the various profiles described above).



From left to right:

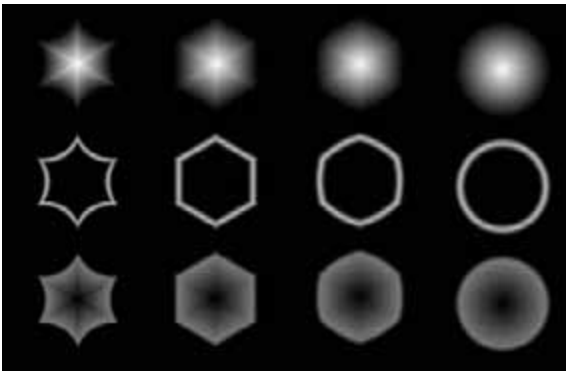
The lens diaphragm of your camera is circular, with three blades, five blades and seven blades.

- You may modify the *Form factor*:

With a factor of 0, the points are linked to form a circle.

With a factor of 1, the points are linked by straight segments.

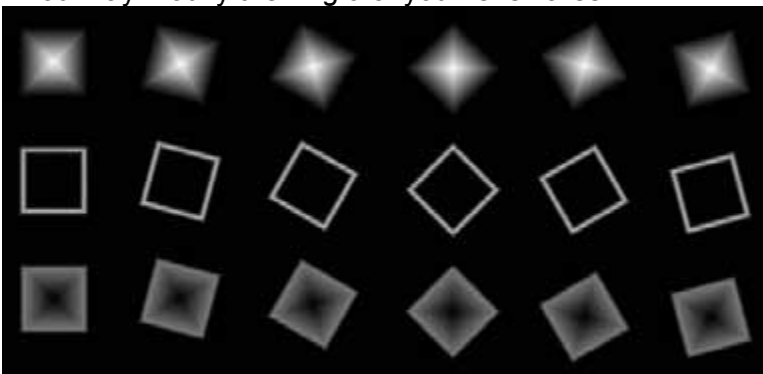
With a factor of 2, the points are linked by incoming arcs.



From left to right:

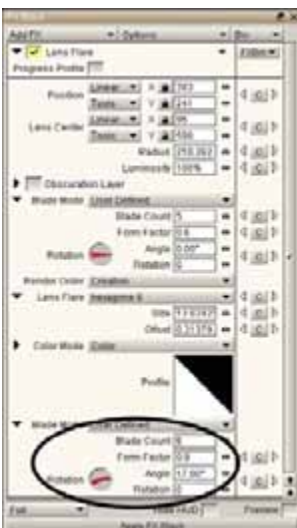
Form factors 2, 1, 0.5 and 0.

- You may modify the *Angle* of your lens flares:



From left to right:

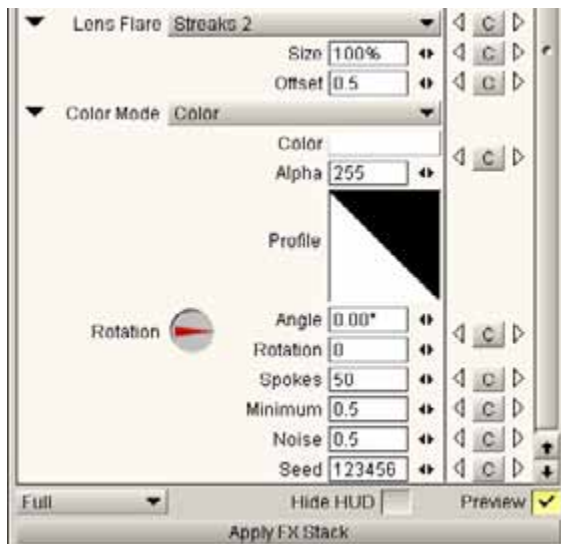
Angles 0°, -15°, -30°, -45°, -60°, -75°.



When required, each *Lens Flare* of the generic type may be given its own *Blades mode* different from the *Global* blades mode described above.

The latter is located at the bottom of the generic *Lens Flare* parameters and offers the same options.

• **Streak type Lens Flares**

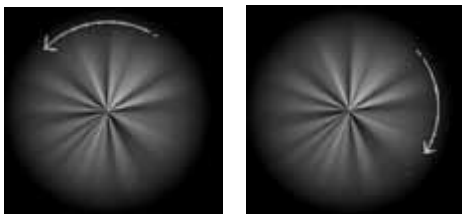


Even if the *Lens Flares* of the *Streaks* type offer a completely different effect than the *Generic lens Flares* (see examples below), the parameters are nonetheless quite similar.

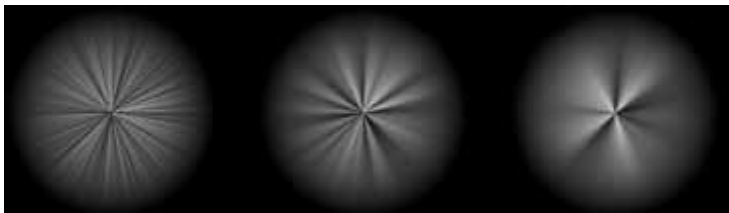
You may therefore set the *Size*, *Offset*, *Color(s)* and *Profile* in the same way as described on the previous pages.

There are, however, several specific options which we will now take a closer look at :

- The *Angle* and *Rotation* parameters are used to rotate light interference effects.

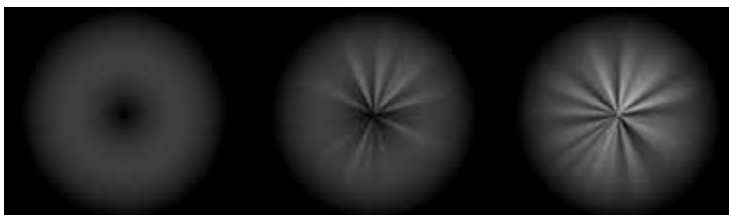


- The *Spokes* parameter is used to select the number of spokes in the streaks



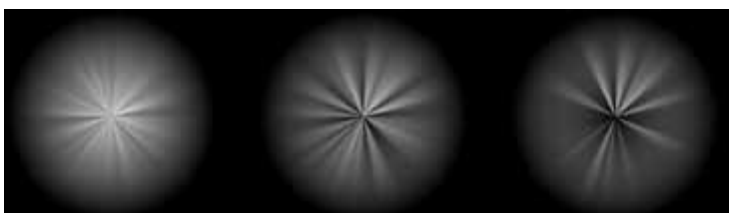
(opposite from left to right the *Spoke* parameter with the values 200, 50, and 20)

- The *Minimum* parameter is used to adjust the contrast between the spokes.
If this parameter is set to 0, maximum contrast is obtained.
If this parameter is set to 1, minimum contrast is obtained .



(opposite from left to right with contrast values 1, 0.5 and 0)

- The *Noise* parameter is used to adjust the sharpness of the spokes:
If this parameter is set to 0, the spokes are less sharp.
If this parameter is set to 1, the spokes are more sharp.



(opposite from left to right with noise values 1, 0.5 and 0)

- The *Seed* parameter is used to randomly vary the streaks layout.



Combined use of several types of lens flares and light interference applied to the same point in your project may create a very realistic effect.

Opposite you will see two generic lens flares and one streaked lens flare to create a sun surrounded by a light halo.

• *Lens Flares of the Image type*



Lens Flares of the Image type allow, as the name implies, selection of the image of your choice to create a lens flare.

* This image, referred to as source image, may be a default image, a project displayed on the screen or even a file for which the access path must be given.

* You may set the *Size*, *Offset* and *Angle* parameters as indicated for the lens flares discussed previously.

* Your image will be applied as a lens flare on the current layer. This is possible in the various *Drawing modes* (color, behind, erase, etc.) studied in lesson 2.

• *The Render order for lens flares*

The *Render order* popup menu offers the following four options :

* *Creation*: your light artifacts are calculated and drawn by the program in the order they were created (i.e. as they appear in the lens-flare popup menu, from top to bottom).

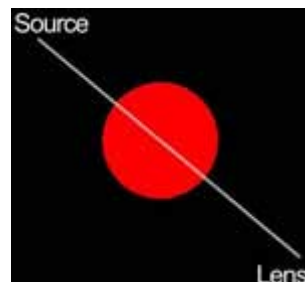
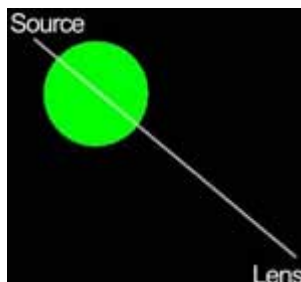
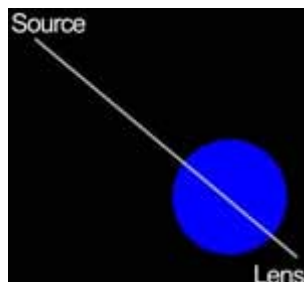
* *Invert. creation*: your light artifacts are calculated and drawn by the program in the inverted order of creation (in the lens-flare popup menu, from bottom to top).

* *Lens to light*: your light artifacts are calculated and drawn by the program according to their offset in the direction Lens => Light.

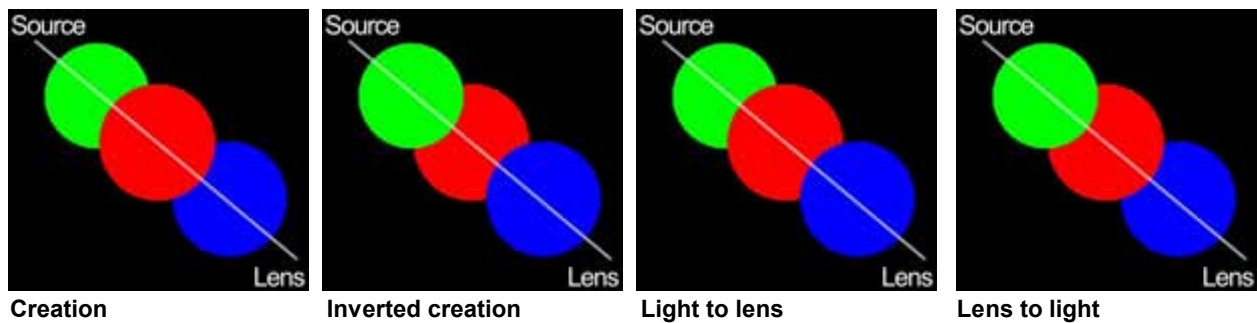
* *Light to lens*: your light artifacts are calculated and drawn by the program according to their offset in the direction Light => Lens.

Take the *image* type artifacts illustrated below, for example.

Based on their position in the *Lens Flare* popup menu opposite, they were created in the following order: blue, then green, then red.



Here you have the effect obtained (for application in color mode) in the various cases:



• The *Lens Flare Obscuration layer*

Let's assume our drawing is animated as indicated below:

When the planet moves and the sun becomes visible, the *Lens Flare* effect becomes visible at the same time.



In general, if an object of any kind passes in front of the light source, the lens flare tends to disappear.

The *Obscuration layer* parameters above allow you to manage this phenomenon.

* To do this, you must first define what is going to block the light source. This may be an image or animation in a layer, project, brush, etc... (*Pre*, *Post Behavior*, *Animation Mode*, *Position* will also be defined if necessary).

* The *Type* of obscuration to take place when the effect is applied must be indicated here:

- The *Alpha* option will block the lens flare when an opaque object passes in front of the light source.

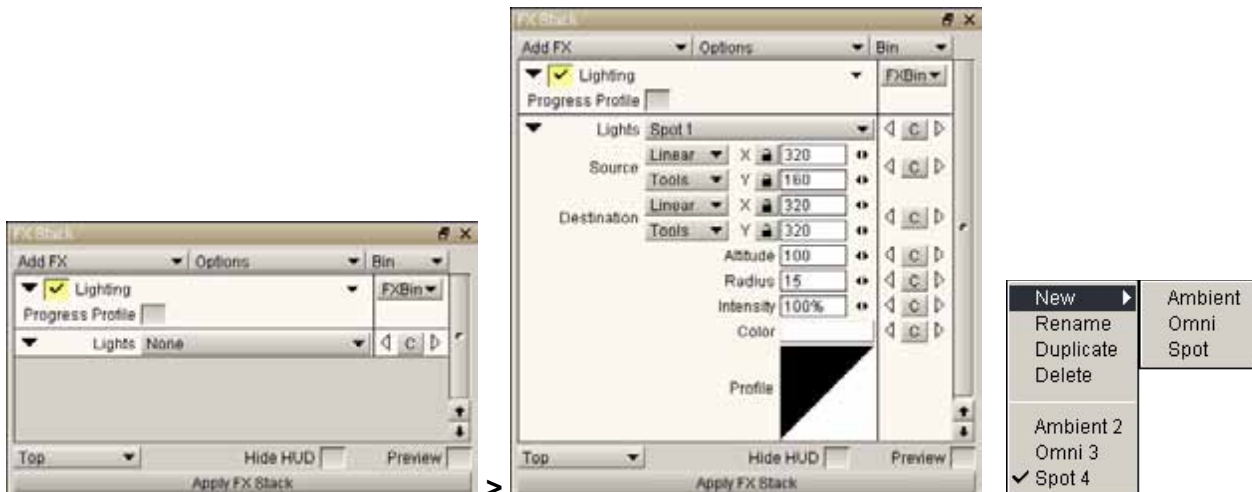
- The *Invert alpha* option will block the lens flare when a transparent object passes in front of the light source.

- The *R.G.B* option will modify the lens flare color so that it becomes identical to that of the object passing in front of the light source.

- The *R.G.B + A* option functions in the same way as the *R.G.B* option but also takes into account the opacity of the pixels in the same way as the *Alpha* option.

* We generally obtain a *Lens Flare* effect when the lens of your camera is pointed towards a very small and very bright light source.

The Rendering > Lighting effect



This effect is used to light up the image or sequence of your choice as if using an exterior light source (light, projector...).

By default, nothing is present in the list. The *Lights* menu may be used to create one or several lighting effects among the following categories: *Spot*, *Omni* and *Ambient*. As soon as a lighting effect is created, you may duplicate, delete or rename it.

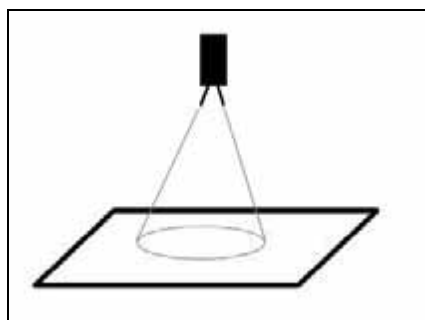
The *Lights* menu displays the name of the light whose parameters are shown in the stack. If you work with several lights you may go from one to the other by selecting their names in the *Lights* menu.

Here an overview of the different lighting types:

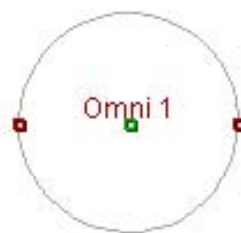
* *Ambient* lighting lights up the scene globally in the color of your choice. Values under 100% will darken the image, values higher than 100% will brighten it.



* *Omni* lighting lights up a circular area of your choice similar to a projector located on an axis perpendicular to the image. The parameters to be set are color, lighting intensity, center and radius of the circular area, as well as altitude of the virtual projector.



Omni projector diagram

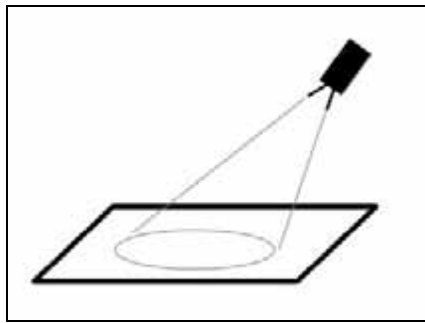


Omni HUD

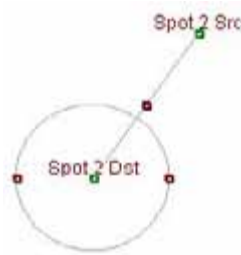


Omni lighting

* *Spot* lighting lights up the image similar to a tilted projector. Two position parameters are available for this mode, which allow you to adjust the position of the light source as well as its direction.



Spot projector diagram



Spot HUD

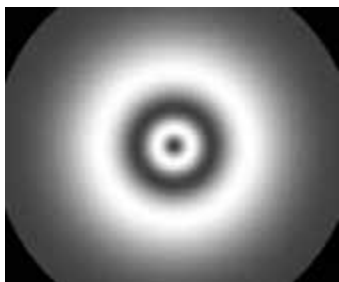


Spot lighting



For many of the parameters described above, the settings may be made directly on the screen (don't forget to display the *HUD*).

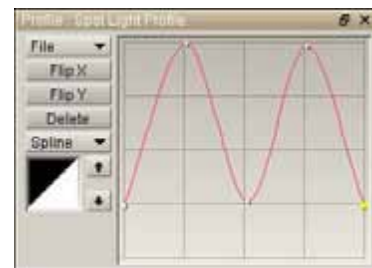
Spot and *Omni* lighting have a profile editor which works similarly to that of the drawing tools (see lesson 2 for more details).



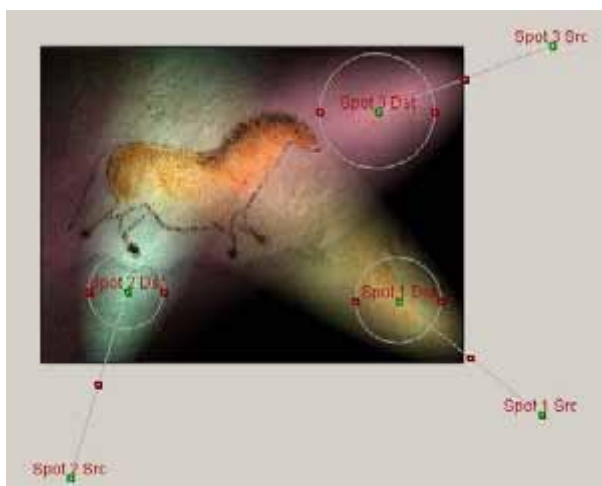
Omni



Spot



profile



With the *Light* popup menu it is possible to use several light sources (regardless of type), as well as to *rename*, *duplicate* or *delete* them.

This is how our cave may be lit up in various ways !



This *Lighting* effect only applies to the opaque pixels of the current layer. To obtain the examples above it is therefore necessary to first merge the layers of our project.

The Rendering > Volumetric Light effect



The *Volumetric Light* effect is in the same category as the *Lighting* effect but it works in a different way :

In this effect, the light source is located under the current layer and it gives the impression of volume to the light.



Here is an example :

Create a new project et fill the current image with an opaque black color.



Set the background as *Color* in the *Timeline*. The background has to be white.



Now put a *TVPaint Animation Pro* logo in *Erase* mode on this Image layer with the *TextBrush* tool, then change this layer to an Anim layer with about twenty images.



Make the *Center* setting move along a path from left to right.

You should get an animation similar to the one like the image sequence on the left.



* The *Volumetric Light* effect requires to adjust the position setting of the light source and possibly its *Path*, its *Power* and its *Length*.



* You can also define the light color, use a color gradient (like in the example on the left) or even have a color that depends on the source image. You can select one of these options in the *Color Source* menu.

* You can also define one of the various blend mode for this color through the *Blend* menu.



The *substitute* mode is only available in this menu, erasing the source image pixels (nearby a white opaque logo on a transparent layer with a black background.)

* The *Channel* menu gives several others possibilities :

Invert Alpha : Lighting comes from the image opaque pixels (see below for example).

Alpha : Lighting comes from image transparent pixels : that's what's happening in the example above.

Luminosity : The more luminous a pixel is, the more lightrays it will let go.

Red, Green, Blue : The more red (or green, or blue) component a pixel has, the more lightrays will go through it.

In the source image on the left below, only the sky and the green tree will emit lightrays when the *blue channel* option is selected. (The green tree color is partially composed of blue.)



Source Image



Luma channel



Invert Alpha channel



Blue channel

* The *Shimmer* section permits to generate interferences in the Volumetric light :
The *Size* setting is used to manage the distribution of these interferences.
The *Angle* and *Rotation* make these interferences pivot and can give the feeling that the lightsource is rotating.
The *Variation* setting accents the contrast between rays.



Without Shimmer



With Shimmer



The *Mask* section allows you to limit the lighting in a circle whose radius has to be defined.

The Rendering > RotoTracking effect

• Presentation and concept

The *RotoTracking* effect is first of all a cut-out effect like the *ChromaKey*, *Colorkey* or *LumaKey* effect. It can also be used to animate drawings in way comparable to those you can encounter in vector based animation softwares.

Here is the principle of this effect : the *RotoTracking* use one or several closed splines (called B-splines) and allow you to change their shape in time, thanks to the key system of the FX-stack. Once the effect is applied, the area inside or outside the spline becomes transparent.

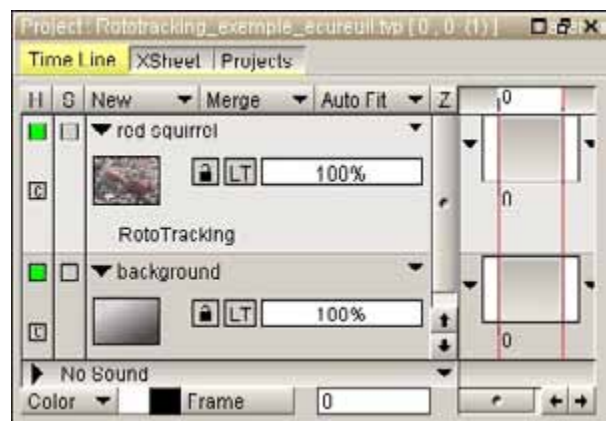
• Two examples

This effect is very usefull when the other keying effects are unable to cut-out a picture or a movie sequence properly.

On the picture below, we see a red squirrel walking on red and brown leaves. As the leaves colors are very close to the squirrel color, the common keying effects will not allow you to cut-out the squirrel correctly. In that case, it is advised to use the rototracking effect



Original picture



RotoTracking spline

>



Applied result

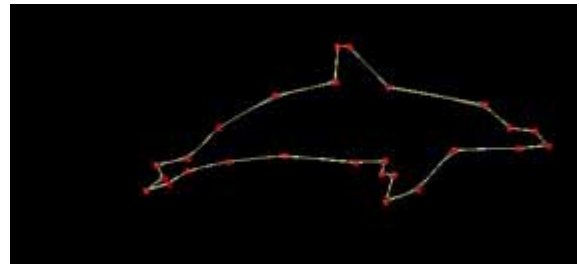
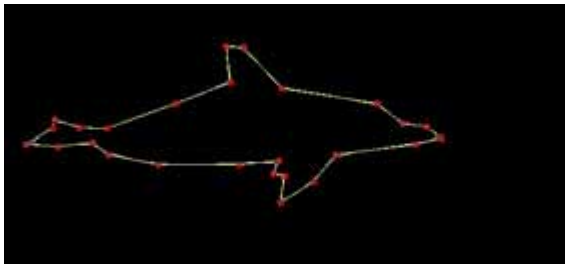
The *RotoTracking* allows also to draw and animate quickly. The control points of the spline can evolve softly from a position to another one. As a consequence, the shape of the whole spline will evolve in time too.

In the example above, a dolphin has been drawn with the rototracking effect.

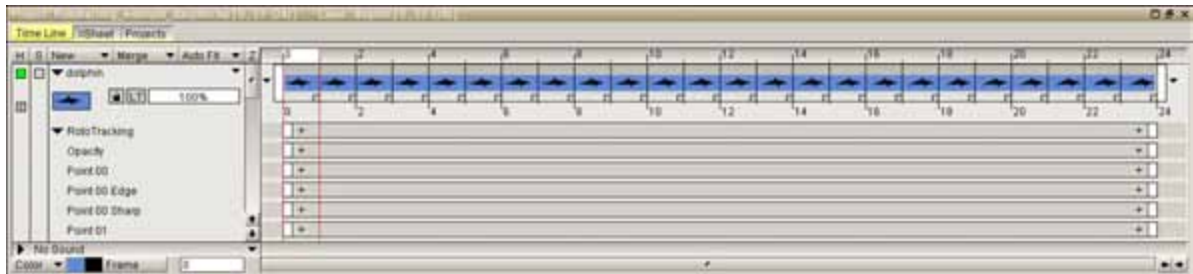
The control points are colored in red and the B-spline itself is colored in yellow.

Every key dot can be animated in time. So it is for the whole spline and thus the dolphin.

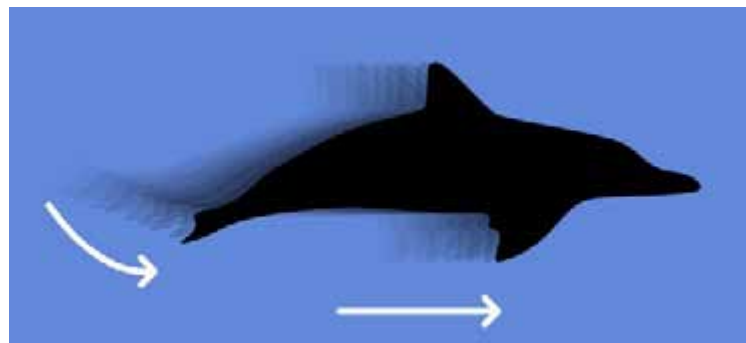
He can for example move his tail to swim.



RotoTracking B-splines created for the first and the last image of the animation layer.



Resulting pictures once the effect is applied.



Resulting animation once the effect is played.



Here is the main difference between the roto tracking and a simple selection created with the main panel tools :

Our B-splines can evolve and change their shape in time.

• The control panel

Let's now study the control panel in detail :

Here is the control panel as it appears when you add the *RotoTracking* effect in the FX-stack. (see below)

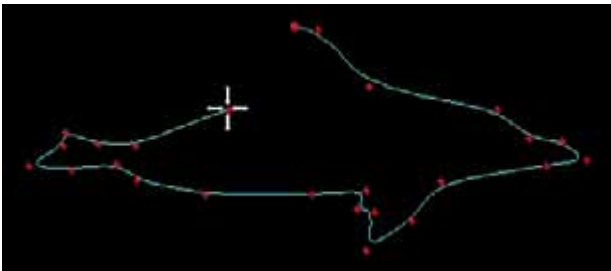


At the top of the panel, the *Spline* popup menu is used to create, rename, duplicate or delete B-splines. Once a first B-spline is created, some new buttons and menus appear. (The *Point* and *Blending Mode* menus)

The effect can use several B-splines at the same time. The header of the menu contains the name of the B-spline for which the options are displayed in the panel.



Enable the *Head Up Display* and check the *Preview* boxes of your FX-stack. Once the first point is drawn on the project window, new parameters related to the points drawn in the screen appear (*position*, *edge*, *sharp*)



To close the spline that you just began to draw, you only have to click on the first point displayed on the screen.



Do you remind Bézier splines ? We encountered them in lesson 2 when we studied the drawing tools. B-splines and Bézier splines are mathematically linked.

Try not to confuse those two kind of splines : Bézier splines go through their control points while B-splines don't.

• Managing the opacity

Once the B-spline is closed, the opacity of the pixel area outside the spline becomes transparent after applying the effect. The pixel area inside the spline stay the same.

This being the case, the two opacity parameters allows you to modify the opacity of any of those two areas.

The numeric field on the top of the control panel allows you to set the opacity of the pixel area inside the B-spline. The numeric field on the bottom of the panel allows you to set the opacity of the pixel area outside the B-spline.

The *invert* button allows you to invert the effect : the area of pixels outside the B-spline will remain unchanged while the area of pixels inside the B-spline will become transparent.



Normal



With the invert button checked

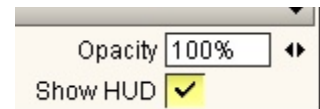




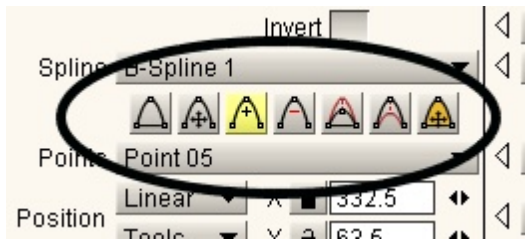
First opacity parameters set to 50%



Second opacity parameters set to 50%



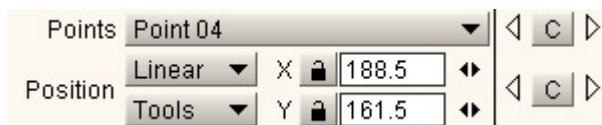
- Let's now study the icons under the *spline* popup menu.




From left to right :



The first icon allows you to place the control points of your B-spline at your convenience. This icon is selected by default each time you create a new B-spline. You only have to use the left mouse button on the project window to lay your control points. Once a control point is created, the *point* menu displays its number and its coordinates. (see below)



If you need to re-open a closed B-spline, you only have to select the «  » icon : again.



This second icon allows to move a control point interactively on the project window. (don't forget to display the HUD). To do this, just click and drag the control point.

This may also be done by using the numeric fields and associated mini-sliders shown above.



It is also possible to move several points at the same time : To do this, simply use your left mouse button to draw a rectangle while pressing the [Ctrl] key. You will then be able to move at the same time all the points located in the rectangular area.



By clicking on the little padlock buttons, it is possible to « lock » your control points in space so that they cannot be moved along the axis (or axes) of your choice. This enables, in particular, avoiding untimely movement.

The locked points may be subject to animation keys and intermediate points in time may be created from the locked points.



The animation keys influence the position of the points in time and not in space.



The third icon allows to add new control points on the B-spline. Once activated, you will note that if you drag your mouse near the B-spline, a small cross appears. (see below) It means that you can create a new control point.



The fourth icon allows to delete the control points of your B-spline. You only need to use the left mouse button on the point of your choice to do so.



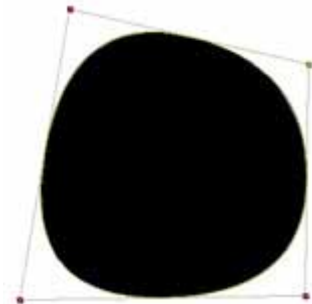
The fifth icon allows to modify the value of the *edge* of a point. To do so, you only have to select this icon and drag'n drop a control point of your spline. You can also use the numerical field of the *edge* parameter. (see below)



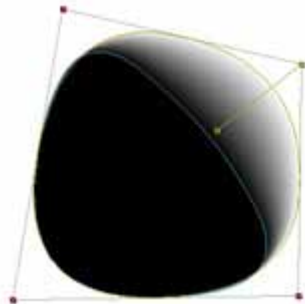
Modifying the edge parameter for a control point allows to change the frontier that the B-spline define.

An opacity gradient will follow the B-spline (see below). This is very convenient to cut a picture more softly (as the tail of the squirrel below)

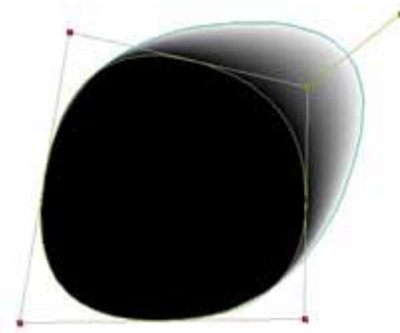
The positive values create an opacity gradient outside the B-spline and the negatives values create opacity gradients inside the B-spline.



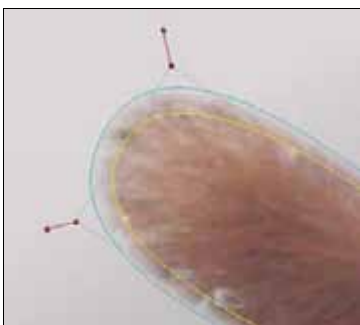
Edge parameter equal to 0



Edge parameter negative



Edge parameter positive



On the opposite screenshot, the edge parameters was used to cut out the tail of the squirrel.



Once the edge parameter is changed, the HUD shows a blue spline. The opacity gradient is located between the yellow and the blue spline and follow the shape of those two splines.



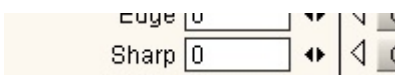
The sixth icon allows you to adjust the sharpness of each point. (the numeric field and the associated mini-slider can replace the interactive HUD)

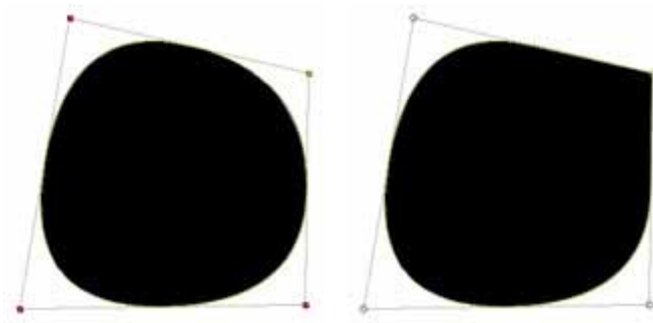
Modify the sharpness is like changing the distance between the spline and the selected control point.

A value of 100 for the sharpness parameter will turn the spline into a pointed one.

The B-spline will follow the angle given by the vertex. (see below)

This allows you to adjust the curvature of the B-spline



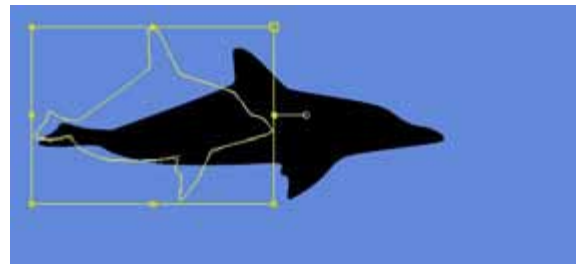


On the left picture, the sharpness parameter of the right-top point of the spline is set to 0.

On the right picture, the sharpness parameter of the right-top point of the spline is set to 100.

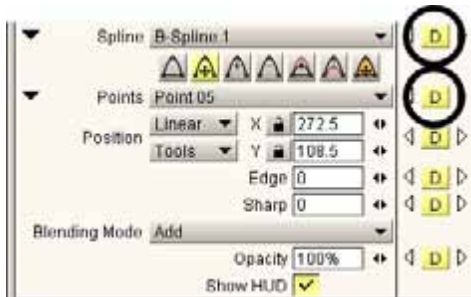


The seventh and last icon turn on the display of a control box which allows to do a lot of modifications directly on the project window (see below)
You may contract, stretch, rotate or translate the current B-spline as a whole by using the handle of the box. (don't forget to activate the HUD)



Use the [Shift] key with a drag action to translate the whole B-Spline

• The master controllers



You could find annoying to create animation keys for every spline and every point of a spline. (for example, a five points spline need almost 30 animation keys to be created if you want to move it from a place to another one.)
That's the reason why the *animation key controllers* have been added in the panel. They are black encircled in the picture opposite.

The *animation key controller* near the *spline* popup menu allows you to create an animation key for each parameter of the spline : points, opacity, ... by using only one mouse click.

The *animation key controller* near the *points* popup menu allows you to create an animation key for each parameter of the point : position, sharpness, edge, ... by using only one mouse click.

• Working with several B-splines

It is possible to use several B-splines.
To create a new B-spline, proceed in this way :

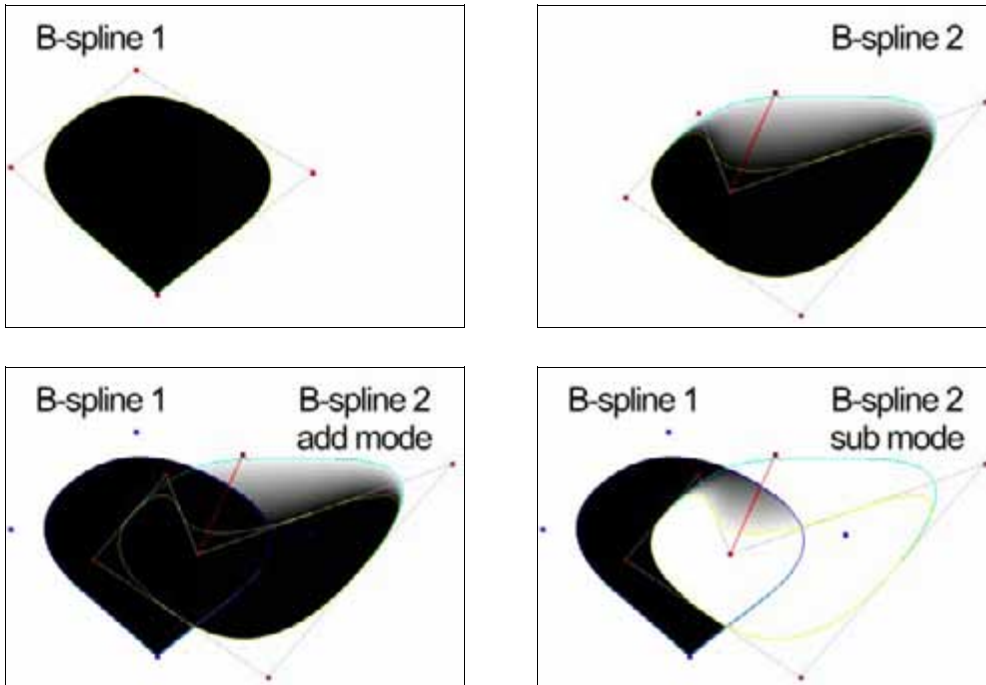
- Select *New B-spline* in the popup menu
- Display the HUD and check the preview box
- add control points on the screen and close the B-spline.
- set the position, edge and sharpness parameters for each points.

• The blending modes

The last popup menu of the *RotoTracking* effect panel is called *blending mode*. It is useful when you manage more than one B-spline.

If you use two splines (this is also true for more than two splines) :

- The *add* mode will add the opacity of the two areas of pixels.
- The *sub* mode will subtract the opacity of the current shape from the second one.



In those two last examples, the edge and sharpness parameters are taken into account.

• Some ideas to make your B-spline move on the screen

Let's take a common B-spline.

The coordinates *x* and *y* of a control point define its position on the screen.

Three options are available in the interpolation menu : *spline*, *linear* or *polynomial*. This affects the path of the control point in time.

If you use the tool menu, its coordinates may follow the path of your choice. You should of course use the *pixel recorder*, *pixel tracker*, etc ... which constitute an excellent way to manage the movement of control points in time.

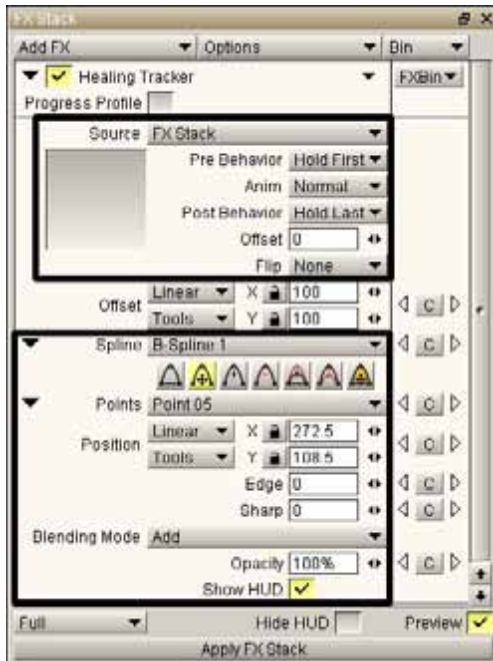
Once the effect is applied, its shape and parameters will go from a location to another one.

The Rendering > Healing Tracker effect

Maybe you recorded a video sequence which contains some faults : it could be a micro boom, a floor lamp or the vapor trail of a plane.

Any modifications to the video-sequence require a lot of work : each frame has to be corrected separately. Most often, you need to remove the unwanted areas of the sequence and finally you have to replace them one by one.

The *Rendering > Healing Tracker* effect allows you to apply this kind of correction really quickly : It combines the use of the Healing mode (studied in lesson 7) and the B-spline notion encountered in the *Rendering > Rototracking Effect* chapter.



The *Healing Tracker* panel appears as illustrated opposite :

In the first section, several choices are available for the source image or footage needed for the healing mode. (FX-stack, current layer, display, paper, current brush, other project, ...)

When choosing another animated source, you may adjust the Pre- and Post-Behavior, the position and the animation mode (random animation, ping-pong, animation reduced to the image indicated in the position parameter, etc.)

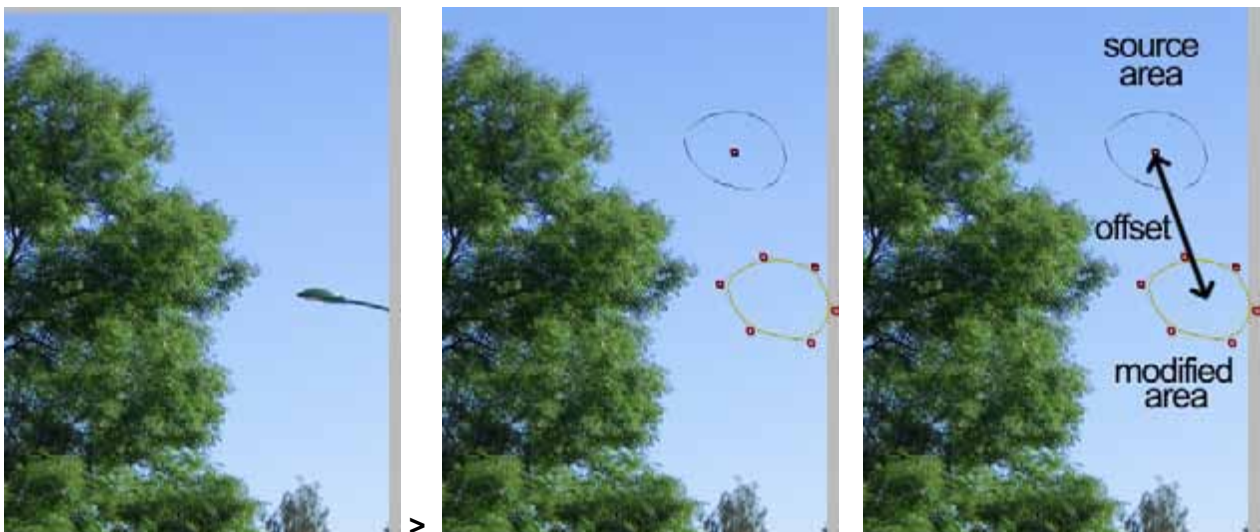
As required, you may choose to flip your source vertically, horizontally or both, before using this source. (see lesson 12 for more details)

In the second section, you can manage your B-splines. This has been explained in detail in the *Rendering > Rototracking Effect* chapter.

Here is how it works :

on the image below, an unwanted floor lamp is visible. This effect will apply the healing mode inside the B-spline surrounding the floor lamp. So the floor lamp will disappear.

The healing source area can be recognized by its unique centered handle (the HUD should be enabled)



Note that the distance (offset) between the healing source area and the destination area of the effect (inside of the B-spline) can be modified in time by using the animation keys. Thoses two areas have always the same shape for a given image of the footage.

Take a look now at the video footage below : a plane is flying slowly in the sky, over the sea.



1st image of the footage



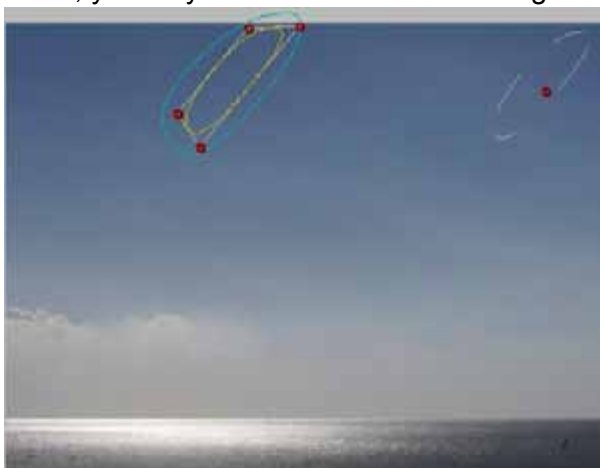
Last image of the footage



Attached timeline

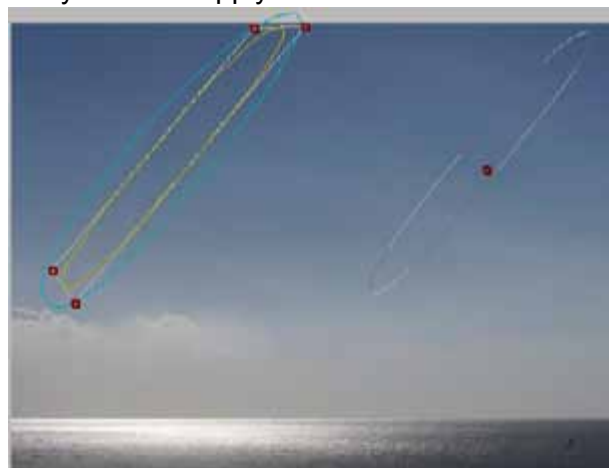
We will now examine in more detail how to suppress the vapor trail of the plane.

- * Firstly, begin by selecting *FX-stack* as source sequence of the *Healing Tracker* effect.
- * On the first frame of the footage, create a B-spline surrounding the vapor trail.
- * Use the *animation key controllers* on the right of the spline menu to create a set of keys for each point of your B-spline.
- * On the last image of the footage, change the shape of your B-spline in order to make it surround the extended vapor trail.
- * Use again the *animation key controllers* on your modified B-spline.
- * Move carefully the healing source area by using the HUD : the vapor trail should not be visible anymore.
- * If you slide along the timeline with the preview mode enabled in your FX-stack, the shape of your B-spline should progressively change.
- * Then, you only have to select all the images of your layer and to apply the effect.



1st image of the footage

(FX-stack preview enabled)



last image of the footage

It is also possible to suppress the clouds at the bottom of the footage :
In order to have a good result, the healing source area needs to be an even section of the screen, without clouds.



Some other spectacular renderings can be obtained if you use another project as source in the *healing tracker* effect. With some training, you should be able to obtain those results :



The healing source project



The picture on which the effect will be applied



Above, one of the two B-splines we used.



**Here is the final result :
The sea has been replaced by the clouds**



The use of the edge parameter for the points of your B-spline is sometimes useful to have better results.

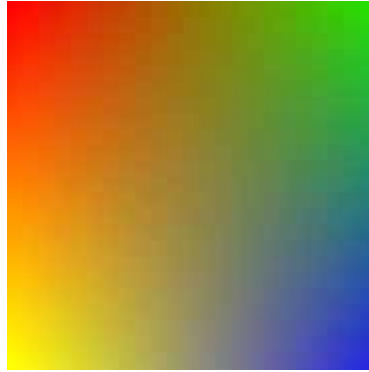
The Rendering > Background Generator effect

The *Background generator* effect is used to create horizontal, vertical or four corner color gradients. These gradients are applied to the current image as described in lesson 2. You may choose any color you like as well as the opacity and then have them change with time by creating animation keys.

Below, you will find four examples of gradients used in *Color*, *Add*, *Tint* or *Subtract* mode. It is also possible to change the colors of clouds, planet, or even place the planet within a bluish atmosphere...



Source image

Gradient in *Color* modeGradient applied in *Colorize* mode

Source image

Gradient in *Color* modeGradient applied in *Add* mode

Source image

Gradient in *Color* modeGradient applied in *Tint* mode

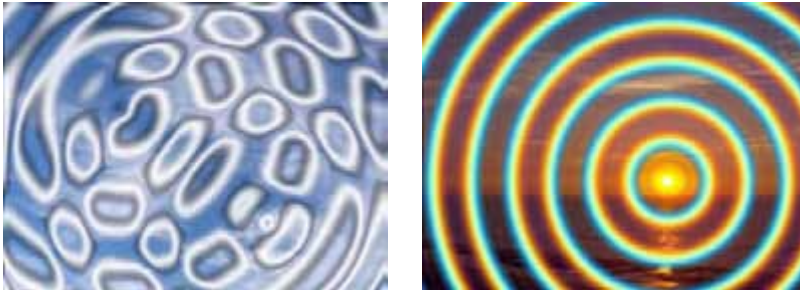
Source image

Gradient in *Color* modeGradient applied in *Subtract* mode

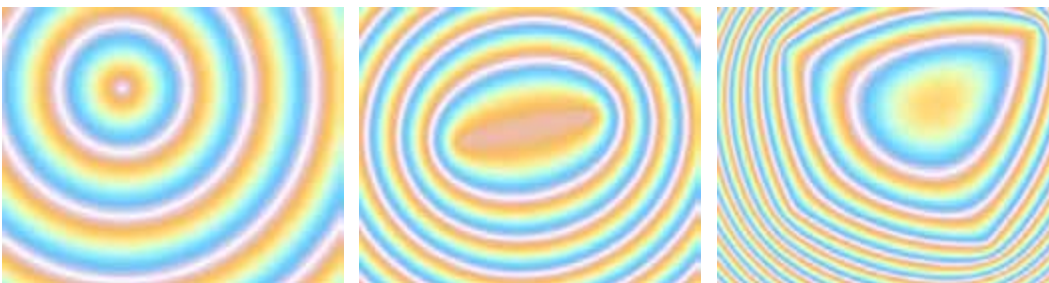
The *Rendering* > *Plasma* effect

The *Rendering* > *Plasma* effect is similar to the Wave effect because they produce both circles. However, this effect produces multicolored waves and can be adjusted with several parameters :

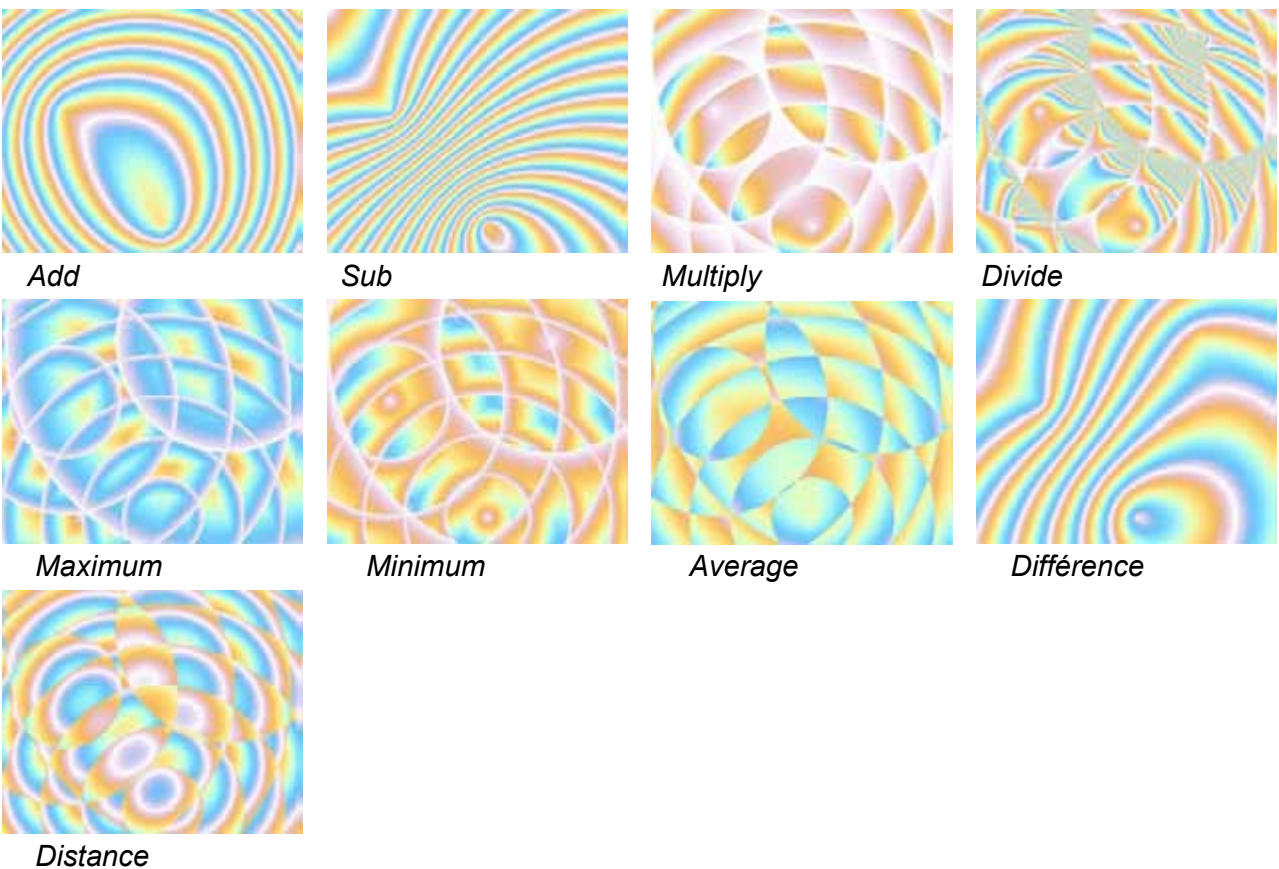
* The *Linear 1*, *Linear 2* or the *Smooth* option in the *Generator* menu in the settings panel modifies the profile of the generated wave's shape (look at the examples below).



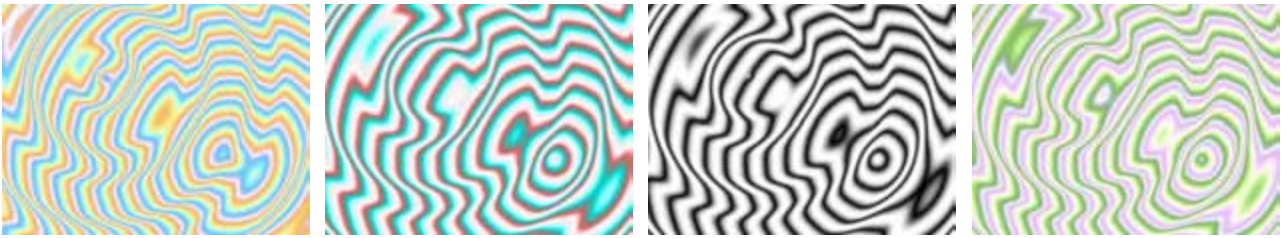
* It is possible to work with one, two, three or four circles (see below).



* You can choose the way these waves will mix together. Below you can find the modes :



* Finally, some settings related to color channels are also available : *Global* phase, *Red* phase, *Green* phase, *Blue* phase and *Alpha* phase.



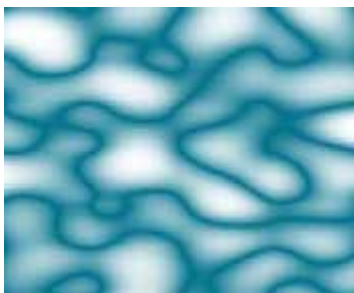
The Rendering > Perlin Noise effect

This effect generates shapes thanks to mathematical functions and is sometimes used to imitates water waves and other water effects.

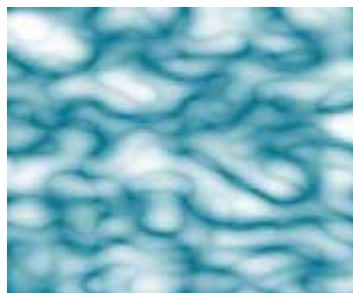


You can :

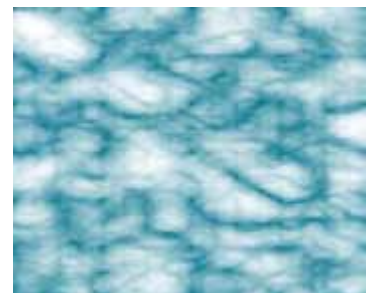
- * adjust *Width* and *Height* of the generated shapes,
- * mix these shapes to the current image thanks to the *Colorize*, *Tint*, *Multiply* (,...) modes,
- * use a picked color, a gradient or the color from the current image,
- * change the complexity of the shapes thanks to the *Octave* setting,
- * *Invert* the effect colors or change its *Opacity*.



Octave = 1

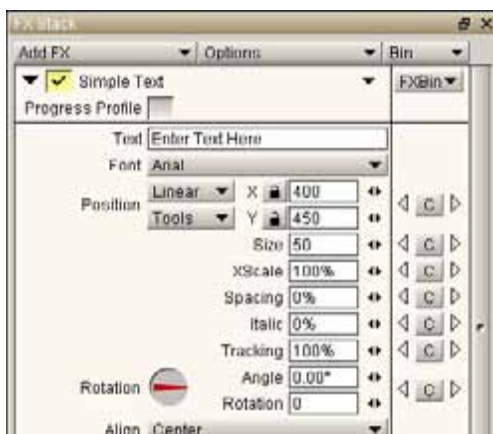


Octave = 2



Octave = 5

The Rendering > Text effect



We saw in lesson 5 how to create a *Text Brush* using the *Text* tool from the tool panel.

The *Rendering > Text* effect should not disorientate you.

- * The *Text* field is where you have to type the text,
 - * The *Font* menu allows you to change the font,
 - * You already know the various settings like *Size*, *Size X*, *Spacing*, *Italic*, *Tracking* and *Angle*. However, these values can be keyframed now (which cannot be done with the simple *Text Brush* tool).
- So you can make a text going bigger and bigger, make it switch to italic, or make the spacing change, etc... or all at the same time !

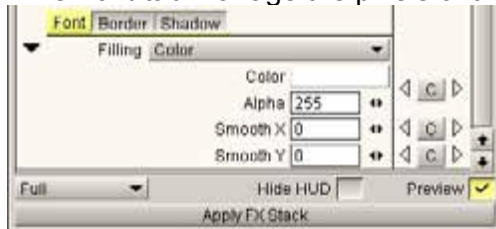
Let's take a look to the new settings :

- * You can make the text follow a path thanks to the *Position* settings (with a stored path or graphically through the HUD).

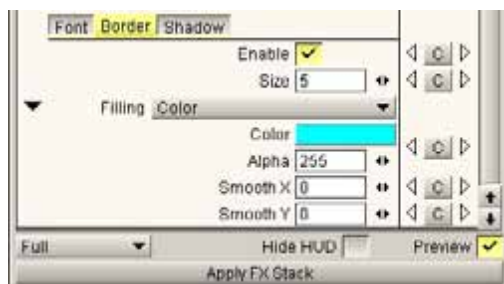
- * The *Angle* setting permits to adjust the angle made by the text (in relation to the horizontal line),
- * The *Rotation* setting can increase the *Angle* value with a multiple of 360,
- * The *Align* menu allows you to change the position of the HUD text handle : right, left, centered.

There are still 3 tabs left :

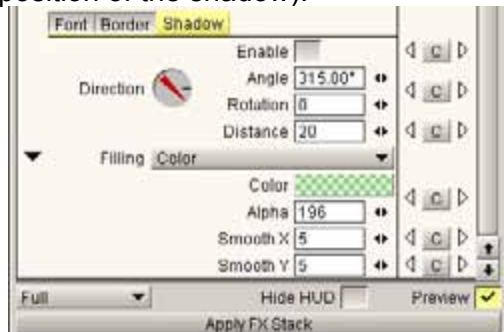
- * The *Font* tab manage the pixels of the text itself



- * The *borders* tab manage the pixels of the borders of the text : you can adjust de thickness of the border).

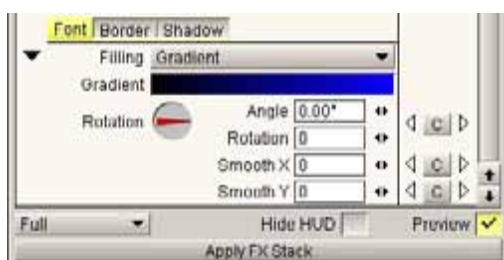


- * The *Shadow* tab can create a shadow for the text : the *Angle* and *Distance* settings give the position of the shadow).

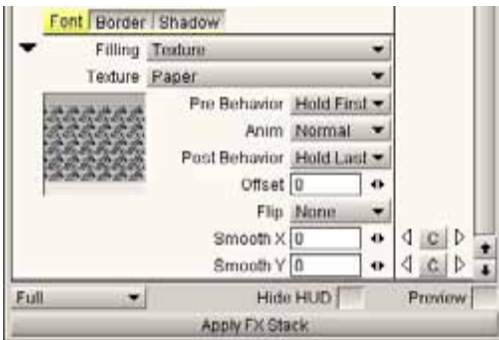


In each tab, blur settings can be adjusted and there are three filling types available :

- * fill with a picked color (you will be able to change its opacity). See the first example of this page
- * fill with a color gradient (you will be able to adjust its angle).

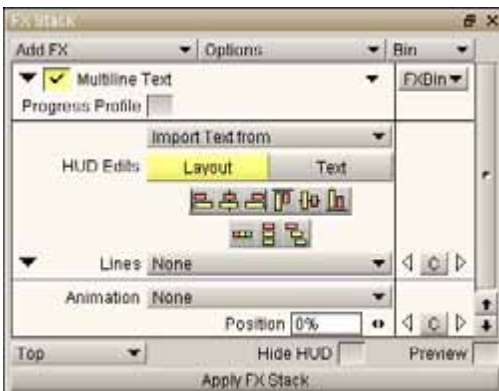


- * fill with a texture you will have to define (current image, spare image, brush, paper, etc...).



TVPaint Animation Pro can use non-occidental fonts like chinese, japanese, arabic fonts, ...

The Rendering > Multiline Text effect



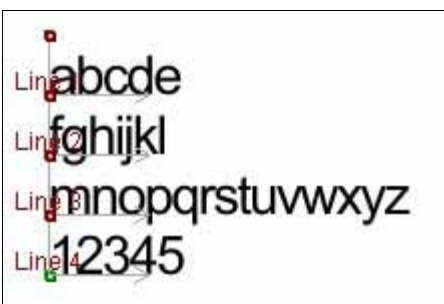
The effect *Rendering > Multiline-Text* is the most important titling tool of TVPaint Animation Pro.

The first thing to do when using this effect is import text lines. To do this you may :

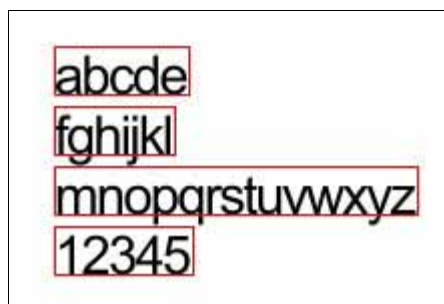
- * use text lines stored in an ascii .txt files
 - * use text lines stored in your clipboard.
- (for example, if you have cut or copied some text from another software)

After this choice, your text is displayed on the screen. Two kind of H.U.D are available for this effect. The parameters directly adjustable on the screen depends on the H.U.D selected :

- * angle, size and position on the screen for the *position H.U.D*
- * the text itself for the *text H.U.D*

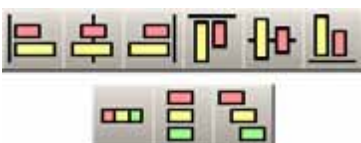


The position HUD

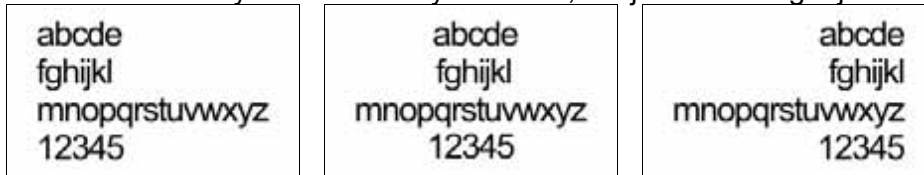


The text HUD

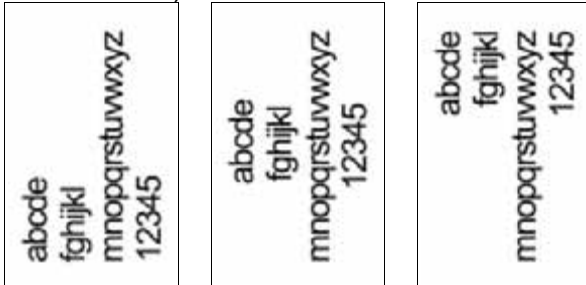
Several kinds of HUD handle alignments are available by using the nine buttons below :



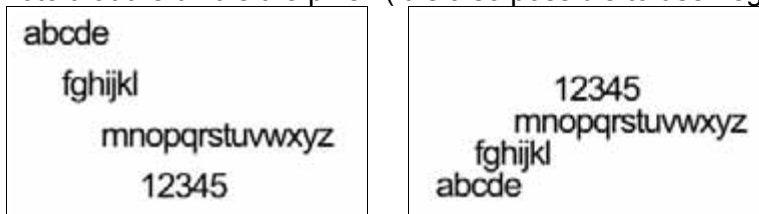
Your text lines may be horizontally centered, left justified or right justified.



Your text lines may be vertically centered, top or bottom justified. (here below the text was firstly rotated at 90°)

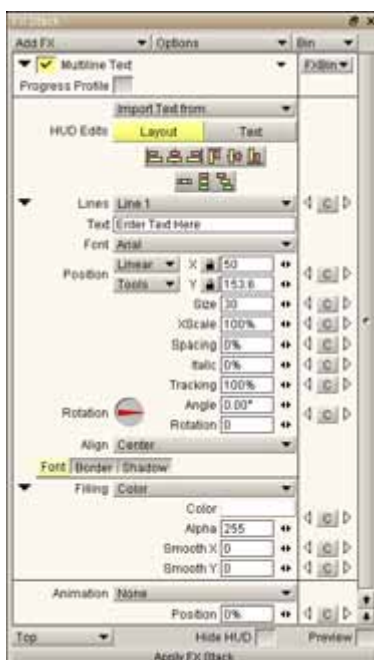


The three last buttons allow you to set the horizontal and/or vertical offset between the text lines. Note that the unit is the pixel. (It is also possible to use negative numbers of pixels.)



It is possible to set or animate each line of the whole text by using the same method than encountered in the Rendering > *simple text* effect. The framed area of the FX-stack below shows the font, position, border, shadow ... parameters discussed in the previous chapter.

At the top of the panel, the *line* popup menu is used to create, rename, duplicate or delete lines. The header of the menu contains the name of the line for which the options are displayed in the panel.





It is possible to create animation keys for all parameters of every line by using the control key located next to the *line* popup menu.

Let's now study the *animation* popup menu :

- * The *roll* option allows you to move your text lines from the bottom to the top of the project window.
- * The *crawl* option allows you to move your text lines from the left to the right of the project window. The progress of those options can be set by using the *position* parameter. The extreme values : 0% and 100% makes the text lines disappear from the screen. A value of 50% corresponds to the initial position of the text lines on the the project window.

The Rendering > Time Code Generator effect



This effect displays the time code of the current image in the current layer at the position of your choice.

Three modes are available:

- * *Current* project mode duplicates the timeline data in number of frames or time code depending on the selections made (*Frame* or *Time Code* refer to lesson 4).
- * *Free run* mode is used to define the parameters to be taken into account for the entire current layer independent of the timeline: You must therefore specify the position of the first frame, the number of frames per second and the display (frame or time code in hours, minutes, seconds and frame number). The *Invert* option is used to create a count-down effect.
- * *User defined* mode works in the same way as *Free run* mode with the simple difference that all frames of the layer have independently set parameters thanks to the use of the animation key system.

Regardless of the mode chosen, the second section of the panel enables:

- * selection of the *Font* of your choice,
- * *Size* variation,
- * setting of *Position* parameters for the current project,
- * modification of font and background *Color* and *Alpha*.

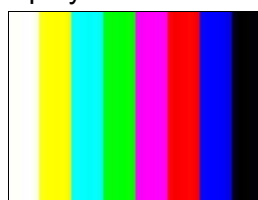


Opposite, an example of an application with the current frame number in black with a gray background.

The Rendering > Pattern Generator effect



The Rendering > Pattern Generator effect allows to display the classical video patterns on screen :



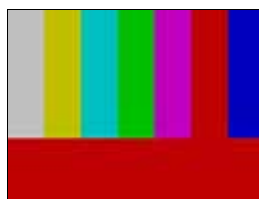
Bar 100



Bar 75



Bar + pluge



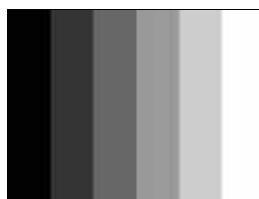
Bar + red



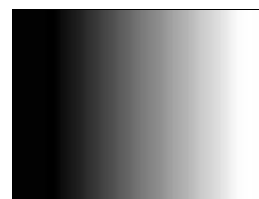
Bar SMPTE



Grey step 10



Grey step 5



Grey ramp

Lesson 17

The *Rendering > Particles Generator* effect

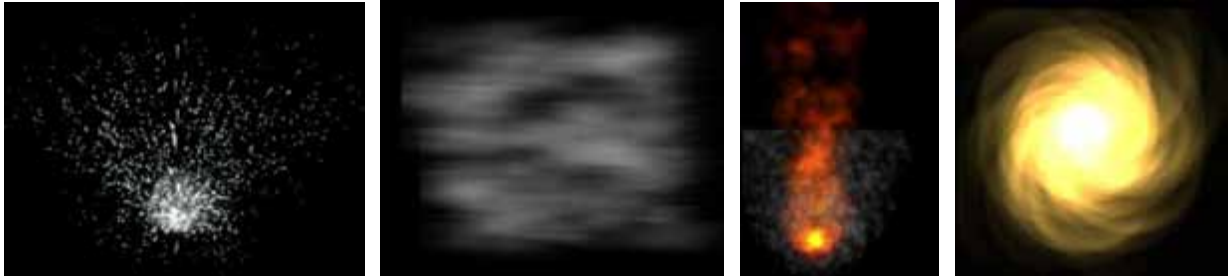
In this lesson, you will learn:

- To create a particles system.
- To modify a particles system.
- To use a particles system in order to add special effects to your videos or put the finishing touches to your animations.

Presentation and concept

Let's take the following elements into consideration: fog, smoke, fireworks, snow, fountains, sunshine, a tennis ball bouncing off the ground.

These natural phenomena and other objects taken from daily life don't seem to have anything in common except maybe that a lot of time is required to make a successful and correct animation of them.



Let's study them more closely:

- Fog and fountain are made of fine water droplets: they are suspended in the air and more or less opaque in the case of the fog; they are projected into the air by a source and fall back with the force of gravity in the case of the fountain.
- Sun and fireworks are respectively composed of helium, hydrogen and various chemical products. The latter are concentrated in a ball for the sun or expelled into the atmosphere in the case of fireworks.
- Smoke is also composed of various chemical products, generating different types of smoke. As it is very light it is not subject to the force of gravity and moves with the wind. The tennis ball, however, bounces several times before coming to a standstill and the wind has little influence on it.

In each case, we deal with « particles » in the broader sense of the word: water droplets, chemical products, tennis ball, etc. These particles move and are affected by the force of gravity, the power of wind or air resistance, etc. They may bounce or come from several places at once. The place or places where the particles come from are referred to as «emitters ».

TVPaint Animation Pro does not only make it possible to draw such particles but also to manage their movement using the parameters described previously. This offers considerable time saving when creating animations and other special effects (drawing and animating the particles one after the other would require months of work...).

You have understood already that it is the effect referred to as *Rendering > Particles Generator* which will help us succeed in this matter.

Learn by example

You will very quickly notice that the particles generator is an effect which offers a wide range of options.

Generally, you need to learn how to set :

- * the parameters of the world (or universe) in which the particles will move: wind, gravity, collision...
- * The parameters of the particle emitter(s): movement, angle, rotation...
- * The particle parameters: life span, velocity, number, opacity...

The multitude of parameters is so vast that it may discourage the beginner. For this reason and for didactic purposes, numerous pre-defined examples have been included in this program to help you master this powerful drawing tool.

Many users use them as a model to introduce the particles into their own creations. These pre-defined examples, sometimes referred to as presets, are accessible via the *Bin FX* menu.



The *Bin FX* menu appears as illustrated opposite:

You are already familiar with the functions *Add*, *Load* and *Save*: they are present for each effect available in TVPaint Animation Pro. However, the functions *Browse* and *Presets* are new.

Choosing *Browse* opens a window that is specific to the particles generator (see below).



In the popup menu you may choose a pre-defined example from the following categories: *cartoon*, *misc*, *nature*, *objects*, *party*, *pyrotechnic*, *sci-fi*, *text*, *water*.

(Using the ▼ and ▲ buttons you may scroll from one example to another.)

When you have chosen an example, its name will appear in the header of the popup menu and you may observe the changes made to the particle system directly in the window.

Two boxes may be checked in order to improve the quality of the particle animation depending on the power of your computer: *Full Quality* and *AAliasing*.

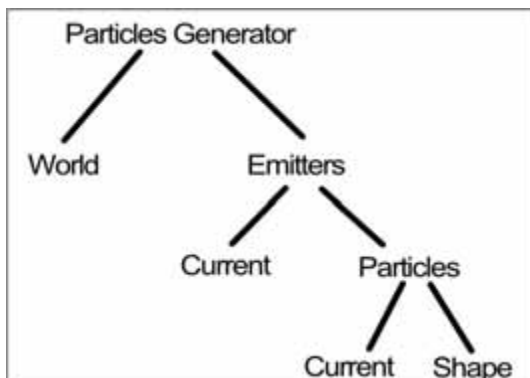
If a pre-defined example is close to the result you wish to obtain for your project, you may choose to set the parameters of the particles generator according to this example. To do this, just click on the *Copy to FX* button then close the window above. Now you study the example in detail and modify it to your needs.

We will come back to this process to illustrate some situations.

The tabs of the *Particles Generator* effect

The *Particles Generator* works with various tabs and sub-tabs which are not necessarily all visible at first use.

Below you will find a summary before starting a detailed description:

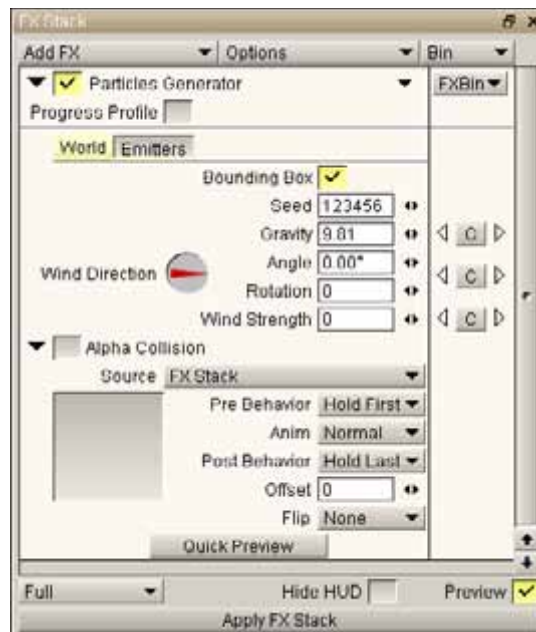


The names in the lower levels are sub-tabs.

For example, the particles tab has two sub tabs : *Current* and *Shape*.

The *World* tab

The *World* tab is used to manage the parameters of the « world » in which our particles will move (see below).



Two preview options are offered in the *World* tab: the *Bouding box* (sic) check box and the *Quick preview* button.



- The *Bouding box* (sic) check box is used to display a colored rectangle around the particles present in the current project window when the preview button of the FX stack is enabled.

The particles going out of the project which are susceptible to come back under the influence of certain factors (wind, gravity, etc.) are also framed.



Although this option may render the preview a bit complicated when many particles are on the screen, it is very useful to distinguish the position of low-opacity particles.



- The *Quick Preview* button displays a window very similar to the one which allows you to choose a predefined set of particles.

Here, you cannot select a predefined example and any parameter modification within your effect will have a direct impact on the animation shown to you.

This is very useful to interactively view and modify a particle animation before applying the effect to all frames of a layer.

This button is present in all other tabs and sub-tabs of the particles generator effect.

The *Seed* parameter is used to generate a random particle emission using calculation algorithms.

This parameter enables changing the rendering so that two effects which would be identical elsewhere are different.



Select the pre-defined example (*water >water jet*) and copy it to the particles generator (see left).

In this example, our particles are water droplets projected from right to left.

Open the quick preview window. We will be able to study the influence of the various parameters available in the *World* tab on the movement of the latter.

The *Gravity* parameter is used to take the earth's gravity into consideration during particle movement.



- When the gravity is increased to, e.g. a value of 10, the water droplets will fall to the ground faster, because the distance between the emitter (water jet origin) and the drop point is shorter.



- Decreasing the value to 0.5 will increase the distance traveled by the droplets. The distance between the point where the droplets are emitted and the drop point is longer.



- When the gravity is set to zero, there is no gravity and the water droplets will follow a straight trajectory.



- TVPaint Animation Pro offers the possibility to work with negative gravity values, which has the effect that the force of gravity may be inverted (the water droplets will then go up).

This is useful in certain cases, for example, to represent metal particles drawn by a magnet.



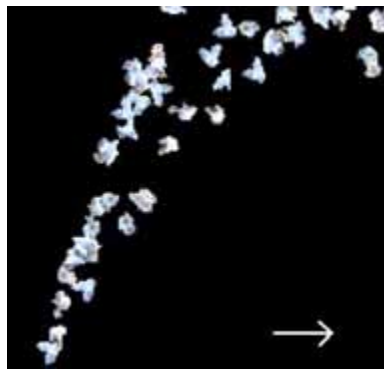
In order for the force of gravity to have an impact on our particles, it is necessary to attribute a *Weight* to them. We will come back to this when we talk about the specific particle parameters.

Let's take a look at the pre-defined example (*objects > popcorn*): the popcorn kernels are our particles and they move vertically to the top before falling back under their own weight.

The parameters *Angle*, *Rotation* and *Wind strength* allow you to simulate the impact the wind has on the particles (see examples below), and to make them more or less move in a direction of your choice (wind with a negative value affects the particles in a direction opposite to the one you have chosen).



Wind = 0



Wind = 100



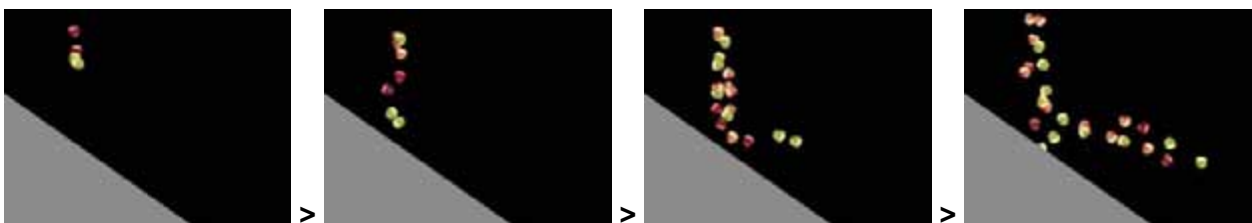
Wind = - 200

Note that using animation keys will allow you, if necessary, to change the direction of the wind in time as well as its strength (to avoid creating a wind that is too uniform).

The *Alpha Collision* menu is similar to the *Source* tab studied in lesson 14 when using the *Keyframer*. We will not go back to the concepts *Source*, *Pre-Behavior*, *Animation*, *Post-Behavior* and *Offset*.

There is, however, a functional difference: when the *Alpha Collision* box is checked, the particles will take into consideration the shape of the image(s) selected by you as source and, in case of a collision with one of them, bounce off them.

Draw a slope with an angle of approximately 30° with the horizontal line on all images of a layer with 120 images. In the particles generator, choose the pre-defined example: (*objects > apples*), check the *Alpha Collision* box and then select *FX stack* as source. To finish, apply your effect.

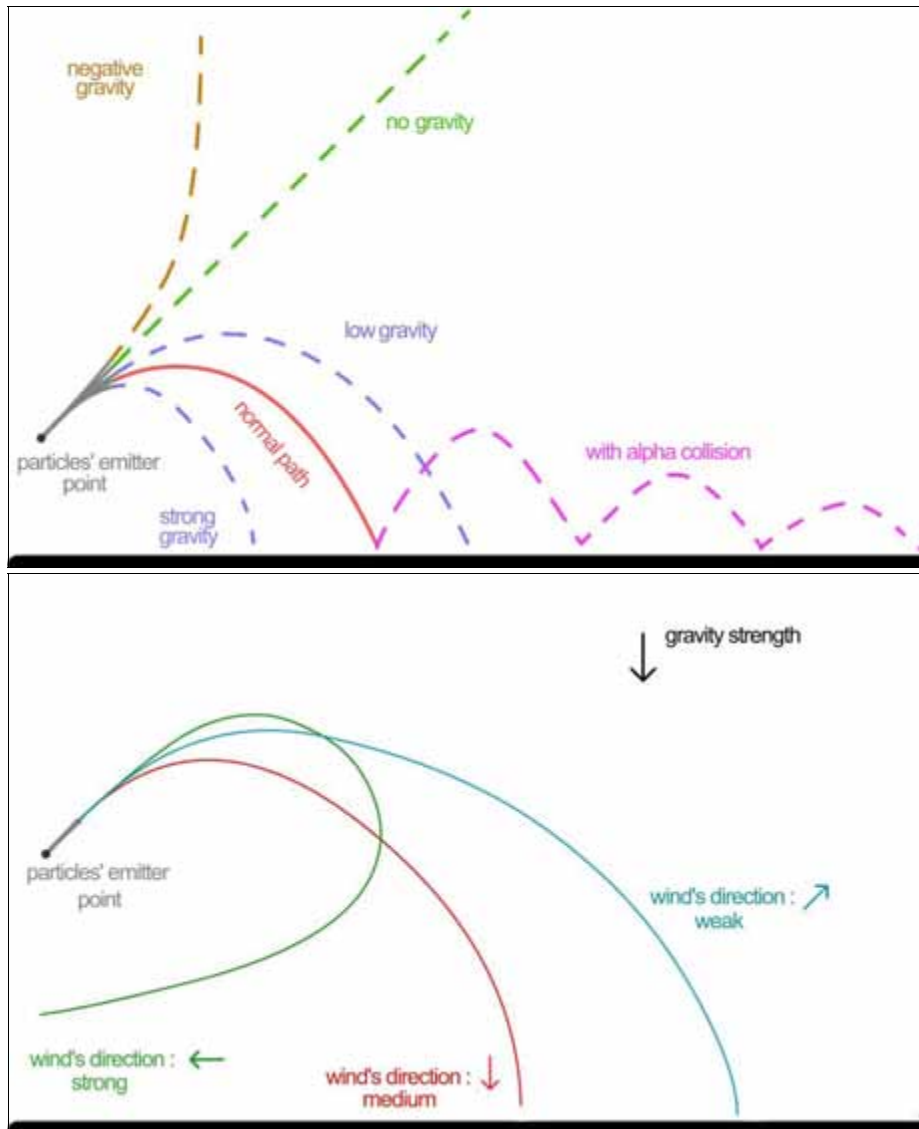


You will note that the apples bounce off the surface that you have just drawn!

This may be taken even further as the surface on which the particles bounce may evolve in time (for this, you have to choose an animated source).

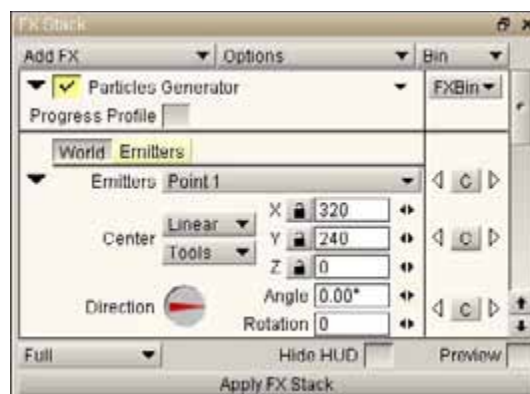
It is even possible to modify the height of the particle bounce, as we shall see later.

Below, you find two summary illustrations for the trajectory of any object.



The *Emitters* tab

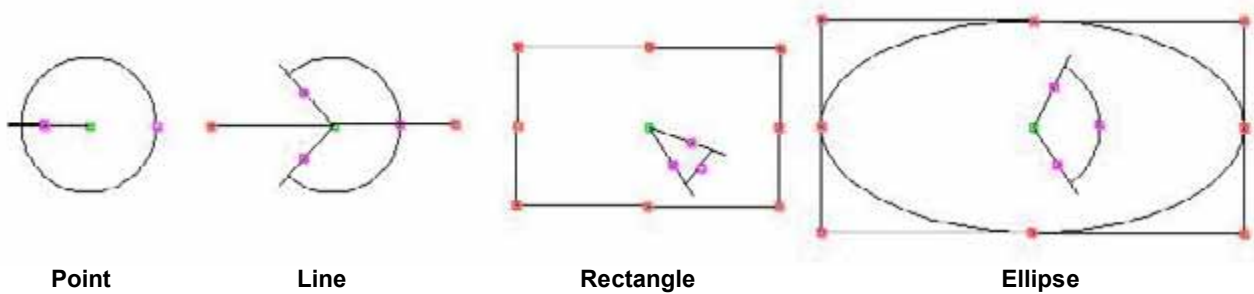
The *Emitters* tab (see below), as its name implies, is used to set the parameters of the sources emitting the particles.



The following emitters may be chosen :

A point (see pre-defined example *sci-fi > galaxywarp*), a line (see pre-defined example *objects > tetris*), a rectangle (see pre-defined example *nature > lava* or *cartoon > eyes*), an ellipse...

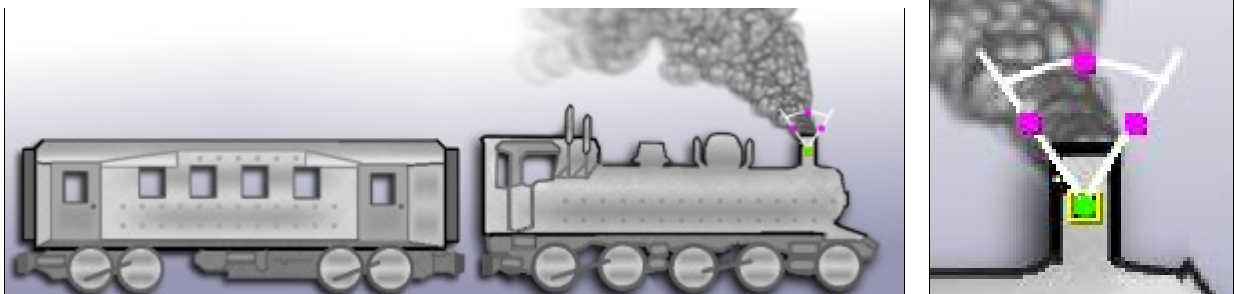
These are the various HUD displayed according to the chosen emitter:



The center of the emitters is shown in green, its shape is marked by red dots.

The purple handles describing the shape of circular arcs indicate the angle at which the particles are projected. We will study them in detail when discussing the *Emitter > Current* tab.

Below, the smoke coming from the steam engine was created using a *Point* type emitter.

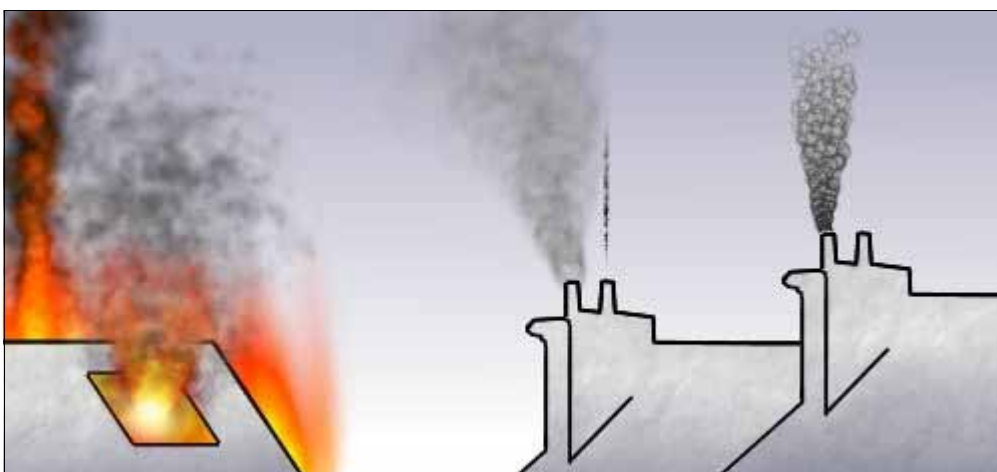


Above, a zoom on the HUD.

These particle emitters are, of course, virtual. If you use the particles generator effect for animating water coming out of a fountain or tap, or smoke coming from a steam engine, you just have to draw the fountain, tap, steam engine...

It is possible to work with several emitters, placed where you want. The *Emitter* popup menu will facilitate your task as it offers you the possibility to *Create*, *Rename*, *Delete* and *Duplicate* emitters (note that the name of the emitter you are working on is displayed in the header of the popup menu).

Using several emitters may be useful when, for example, you wish to animate a building starting to burn: with several emitters, fire and smoke may come from several windows or chimneys with varying intensity (see below).



All these types of emitters have a center that you may place wherever you wish using the X, Y and Z coordinates (the « Z » coordinate is used to set the depth parameter as you have already seen when studying the *Keyframer*).

The *Tools* and *Interpolation* (*Linear*, *Spline* or *Polynomial*) popup menus are used to define the path to be followed by your emitter source in time.

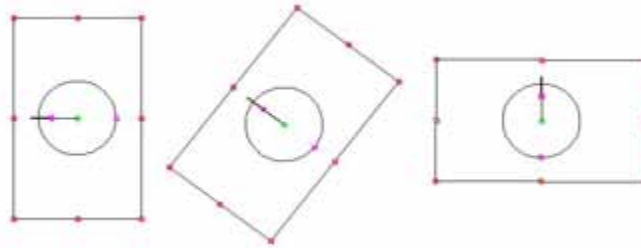
By clicking on the little padlock buttons, it is possible to « lock » your emitters in space so that they cannot be moved along the axis (or axes) of your choice. This enables, in particular, avoiding untimely movement.

The locked points may be subject to animation keys and « intermediate » points in time may be created from the locked points.



The animation keys influence the position of the points in time and not in space.

The *Angle* option is used to point the emitter in the direction of your choice. It is also possible to turn your emitter using the animation key system. The *Rotation* parameter is used to manage rotations of more than 360°.



Some settings, not shown above, are specific to the emitter you choose to work with. Depending on the emitter chosen these are: length of the line, length and width of the rectangle, size of the two ellipse axes.

You will note that, once the emitter is created, two tabs appear: the *Current* tab and the *Particles* tab.



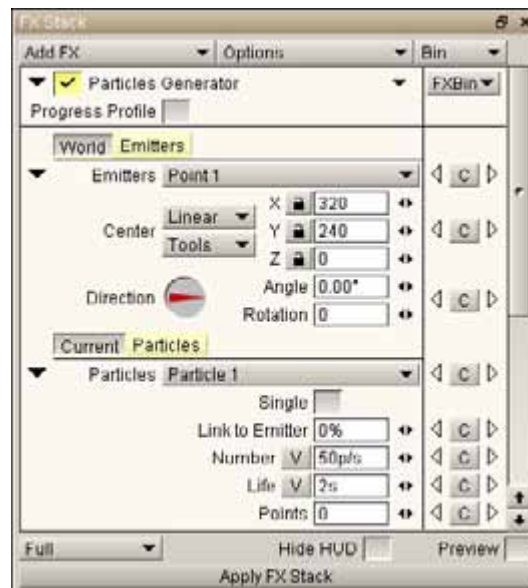
The *Emitters* > *Particles* tab

The *Emitters* > *Particles* tab is used to manage the particles projected by the emitter.

The *Particles* popup menu enables creation of one or several sets of particles. Several types of particles may be emitted: see the pre-defined examples (*sci-fi* > *galaxywarp*), (*party* > *magic candle*) or (*pyrotechnic* > *explosion-b*) to convince yourself.

You may also duplicate, rename or delete a set of particles via this same menu. The name of the set of particles you are working with appears in the header of the popup menu.

As soon as a set of particles is created, new parameters for setting the particles appear (see next page).



All particles appear, move along the screen and then disappear again. The time the particles move is referred to as the *Life span* of the particles.

The *Life* parameter is used to adjust the particle life span in seconds:

- it is short for fireworks : *party > magic candle*
- it may also be long: *nature > fog*.

The *Number* parameter contains the number of particles emitted per second:

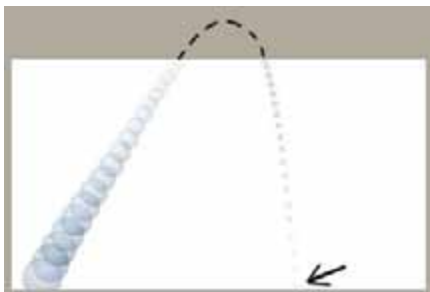
- if required, this parameter may be very high: pre-defined example (*sci-fi > galaxywarp*)
- or reduced : pre-defined example (*object > dice*)

A decimal number enables emission of a very small number of particles. For example, a setting of 0.3 generates a particle every 3 seconds, a setting of 0.01 generates a particle every 100 seconds.

When the *Single* box is checked and one particle has been emitted, no other particle will be emitted before the last particle has reached the end of its life, whether it is still on the screen or not. The pre-defined example (*object > golf shot*) is ideal for testing this option.

Let's assume that the *Life span* of our *golf ball* particle corresponds to the time it spends in the air (once the ball has landed, it is no longer possible to see it in the sky and it is too far away from the field of view to see it on the grass from afar).

If you check the *Single* box, a new golf ball will be shot only when the first ball has landed, independent of the fact whether the latter has left the screen on its trajectory or not (and even re-entered it on the same trajectory ... see below).



Shooting the second ball when the first has landed (i.e. at the end of its life ...).

The *Number of Points* is only valid with the emitters line, rectangle and ellipse.

It is used to distribute the areas from which the particles are emitted along the contours of the emitter you are using.

Below, the particles of the pre-defined example (*party > stage lights*) are used with a *Line* type emitter then with an *Ellipse* type emitter.



Line type emitter

From top to bottom :
Point parameter = 0 or 1
Point parameter = 3
Point parameter = 5



Ellipse type emitter

Point parameter = 9

A parameter referred to as *Link to emitter* is present in this tab: it is used to define whether the particles will follow an emitter or not when it moves along the path chosen by you.

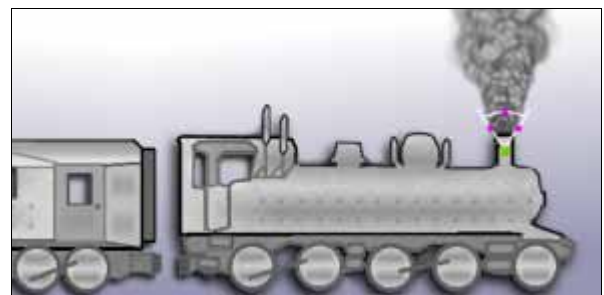
1st example: a steam engine was drawn on the screen. The *Keyframer* effect was used to simulate steam engine movement from left to right.

A *Pixel tracker* was used to create a path which follows the engine's chimney. Therefore, when the train moves, an emitter following this path will always be at chimney level.

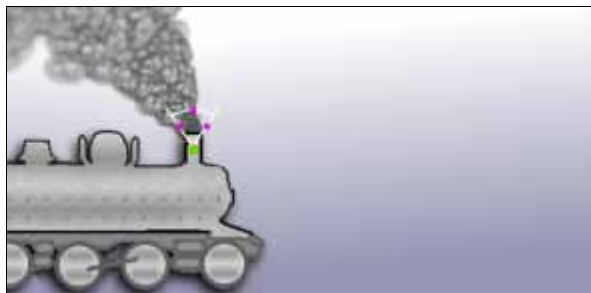
In the images below, the smoke particles are linked with the emitter which is the engine's chimney set at 100%. The movement of the smoke is not natural.



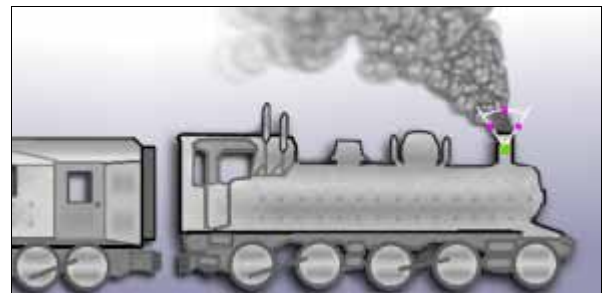
>>



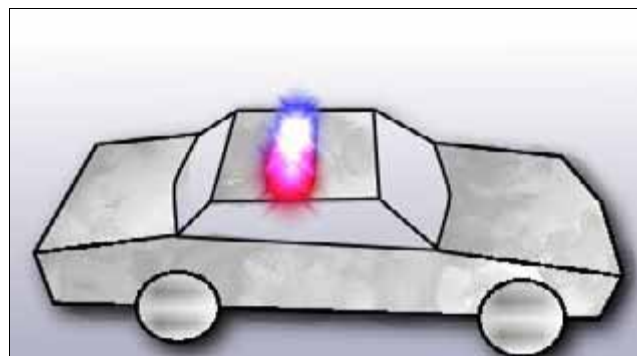
In this drawing, the parameter *Link to emitter* is 25%. This time, the smoke movement is correct.



>>

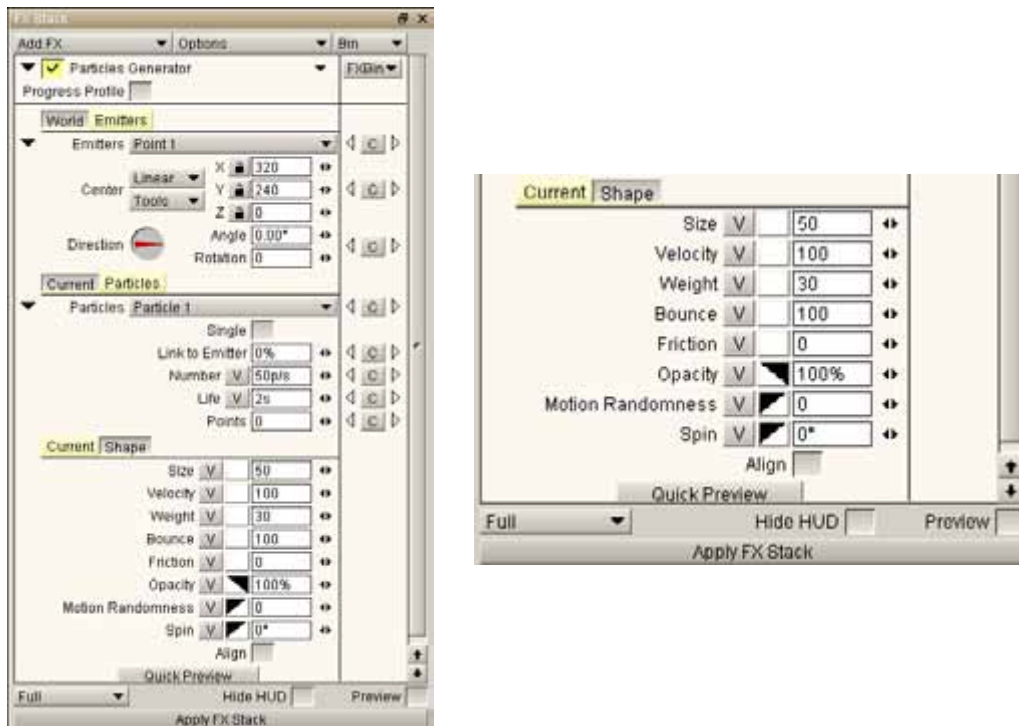


2nd example: the beacons below, as they are particles, are necessarily linked to their emitter: the roof of the police car. They move at the same time as the car when it is driving. The *Link to emitter* is therefore 100 %.



The **Emitters** > **Particles** > **Current** tab

This tab is used to manage the properties of the particles themselves.



The most simple are *Velocity* and *Size*: any pre-defined example may be used to study these two notions.

The parameters *Weight* and *Bounce* are more subtle :

- The *Weight* of a particle has an influence on its movement if the *Gravity* parameter in the *World* tab is not set to zero: the heavier a particle, the more the force of gravity will accentuate its movement. The lighter it is, the less effect the force of gravity will have.

A *Weight* of zero has the result that the particle is not subjected to the force of gravity.

If you place the pre-defined example (*nature* > *sun*) in the stack and then modify the gravity parameter, you will note that this has no influence on particle movement.

- The *Bounce* parameter is used to set the particle bounce strength (the *Alpha Collision* box of the *World* tab must be checked and a collision source chosen...).

Below: the *Bounce* of a tennis ball thrown left to right for different parameter values: 85, 100 and 115 (note that values over 100 cause unnatural bounces relative to the laws of physics...)



- The *Friction* parameter is set to slow the particles down. If the particles move through the air (which is most often the case), we are dealing with air resistance. The latter is low and a parameter set at a value close to zero will be sufficient.

There are, however, other situations : let's assume that the balls are thrown at floor level. These balls will slow down and stop due to the friction of the floor. If the same balls are thrown on a lawn, they will be stopped even faster.

The pre-defined example (*objects > dice*) also provides an interesting case: by increasing the *Friction* parameter to 180, and due to the fact that the particles grow smaller in size during their life span, one gets the impression that the dice roll on a surface and, after a certain limit, fall into a void.

- The *Opacity* parameter is used to set particle transparency.

This is very useful, for example, when you are animating soap bubbles: these wouldn't be perfectly opaque...

- The *Motion Randomness* parameter controls the movement of imperfect particles and accentuates the realistic aspect of the particle jet. It is used, for example, to create an uneven fog, movement of bubbles in the air, smoke, etc.

This parameter is used to avoid having to create too many animation keys which would be required to render a trajectory uneven. This parameter comes into its own with the *Variation* parameter described hereafter. The pre-defined example (*party > popcorn*) uses this method.

- The *Spin* parameter controls particle movement around its local axis (the latter is defined in the *Handle* popup menu of the *Shape* tab which will be discussed below...)

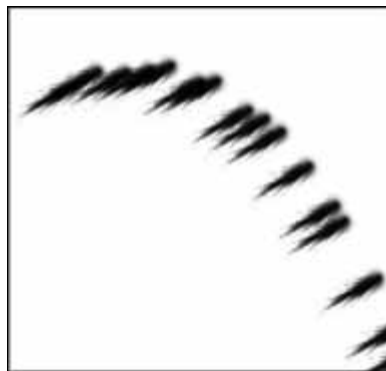
Its use may provide various results. As required, study the pre-defined examples (*objects > dice*) and (*objects > tetris*).

- The *Align* parameter, if enabled, acts on the rotation parameter and directly turns the particles according to their trajectory.

See below : two particle jets with and without alignment.



With alignment



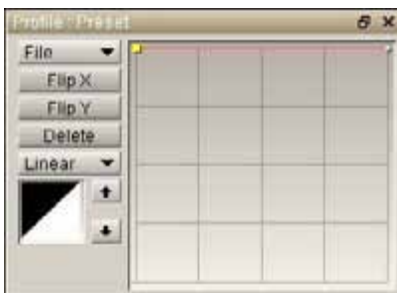
Without alignment

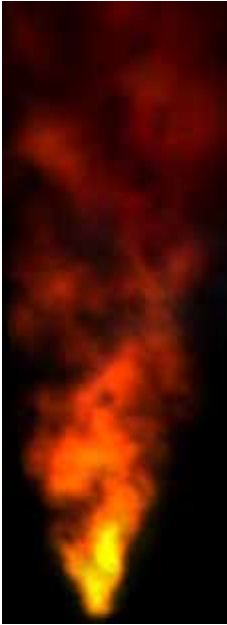
All parameters studied have the parameters *Variation* and *Profile* to their left.



The profile preset is used to vary a parameter (*Size*, *Velocity*, *Opacity*, *Bounce*, etc.) during the life span of a particle.

Click on one of the profile icons (circled in black in the example opposite) to open a traditional profile window. We have already seen these when studying the drawing tools.





Let's take the pre-defined example (*pyrotechnic > smoketrail*) shown opposite.
The three circled profiles below are those used in this example.
You will note that the particle behavior and profile size and opacity are well balanced:



* The smoke particles are small close to the emitter source and become bigger as the smoke dissipates in the air.



* The smoke particles are opaque at the beginning (yellowish-orange areas) and become transparent at the end (red-black areas).



A parameter with the profile indicated opposite does not vary during the period the particles are displayed and remains at the value you have chosen.

The *Variation* represented by the *V* button is used to render the parameter with which it is associated more or less random. RMB click on the *V* icon to enter a numeric value in this field.

For example, if the particles *Size* parameter is set at 50, a *Variation* with a value of 25 means that each particle emitted will have a random size ranging from 25 to 75.

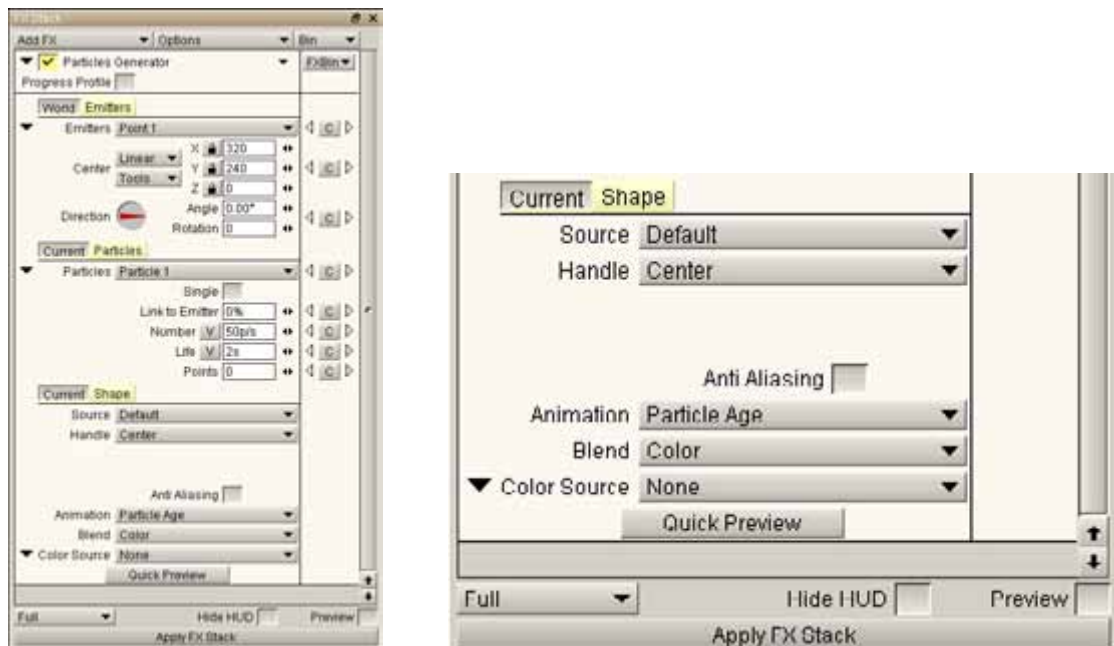
In the example given above (*misc > plumefury*), the variation function was used to attribute the particle *Size*, *Spin* and *Life* random values.



Combined with the *Motion randomness* parameter and correctly used, the *Variation* function provides excellent results. It is almost impossible to tell that a computer was used to create this effect!

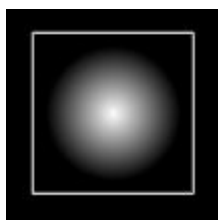
The tab *Emitters > Particles > Shape*

This tab is used to define the type of particles to be used.



The *Source* popup menu is used to select either a default particle (circular with an opacity level decreasing towards the edges) or an image of your choice. When required, the image may be a brush, animated brush or current project.

In the case of brushes, you may select it using the file requester.



Opposite, use of the default particle.

The *Anti-aliasing* option allows you to finalize the general aspect of the particles. We have already discussed this when studying the drawing tools (lesson 2 and lesson 7).

The *Handle* menu works in the same way as that encountered when studying the brush and animated brush tools. It defines the particle axis which is the reference axis when a spin is imposed on the particle.

You may choose a handle located in the center of the particle (more precisely, in the center of the *HUD* rectangle surrounding it) or in one of the four corners of the latter.

As a last resort, you may even place the handle manually.

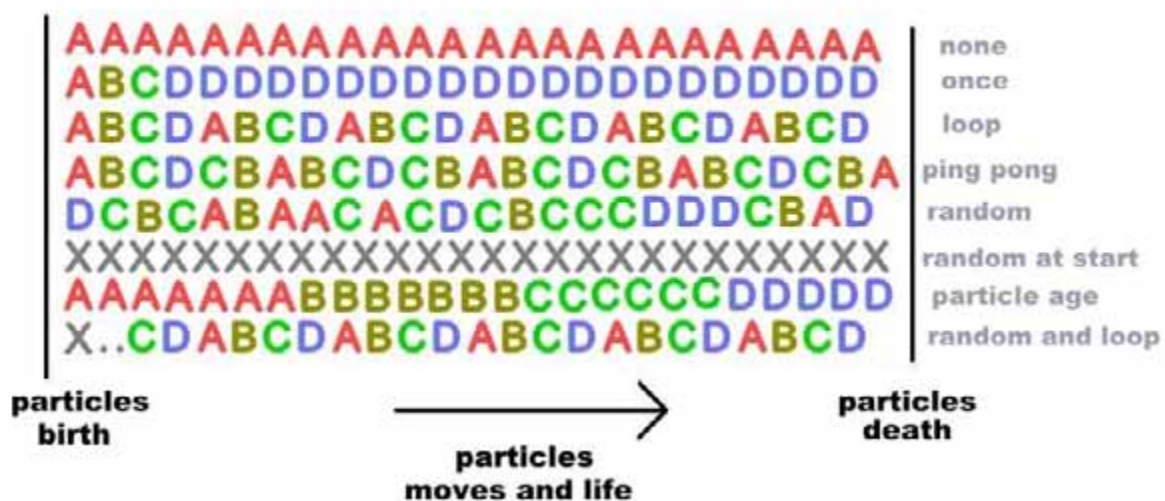
The *Handle* is also used as a reference point when calculating collisions. Furthermore, if you need to calculate a collision, it may be wise to place the handle elsewhere than in the center of the particles in order to obtain better results (see diagrams below).



When the *Source* chosen is an animated brush, the *Animation* popup menu is used to set the order in which the source images appear on the screen:

- The *None* option authorizes display of the AnimBrush's first frame only.
- The *Once* option is applied to each frame of the animated brush one after the other and stops at the last.
- The *Loop* option is also applied to each frame of the animated source one after the other, but starts a new cycle each time it reaches the last frame and so on until the particle dies (see predefined example: *objects > coinfontain*).
- The *Random and Loop* option randomly selects a start frame amongst the frames making up the animated source, then repeats these source frames in order starting from the selected frame. When the source footage has come to an end, it starts again (see predefined example: *cartoon > eyes*).
- The *Ping pong* option is used to first repeat the animated source frames in a rising order. Once the last frame is attained, it repeats the frames in a descending order and so on until the end of the particle lifespan.
- The *Random* option is used to display the animated source frames randomly.
- The *Random at start* option is used to display the animated source frames randomly for each particle, and then to keep it until the end of the particle life span (see predefined example: *objects > tetris*).
- The *Particle age* option varies the source frame displayed according to the age of its particle. All animated source frames are displayed once during the particle lifespan.
- With the *Particle direction* option the animated source frame chosen depends on the direction of the source in space. A coin thrown into the air, for example, will show one side on the way up and another on the way back down to the ground.
- With the *Generator's direction* option the animated source frame chosen depends on the angle formed between the particles generator and the horizontal plane (see above in the chapter *Emitters* tab page 7 with examples line, point, rectangle or ellipse).
- With the *Emitter direction* option the animated source frame chosen depends on the angle formed between the particles emitter and the horizontal plane (see below in the chapter *Emitters/Current* tab, page 18).

4 images AnimBrush : **A****B****C****D** $X = A, B, C, \text{ or } D$



The *Blend* popup menu is used to choose the mode to be used when drawing the particles on the screen (*color*, *behind*, *erase*, etc...). Refer to the predefined example (*nature > sun*) for an example of how to use the *Add* mode.

In lesson 2 you were given a detailed description of the drawing modes available in TVPaint Animation Pro (the *Substitute* and *Mix* modes refer to the modes encountered when using a spare image).

The *Color source* popup menu is used to modify the particles' color:

- The *Color* option is used to give a tint of your choice to the particles (use the *Color* box and *Alpha* parameter).

An *Alpha* value of 100% will totally change the natural color of the particles.

- The *Gradient* option is used to modify the color of particles emitted based on a color gradient (refer to the predefined examples: *party > fireworks* or *misc > worma*).

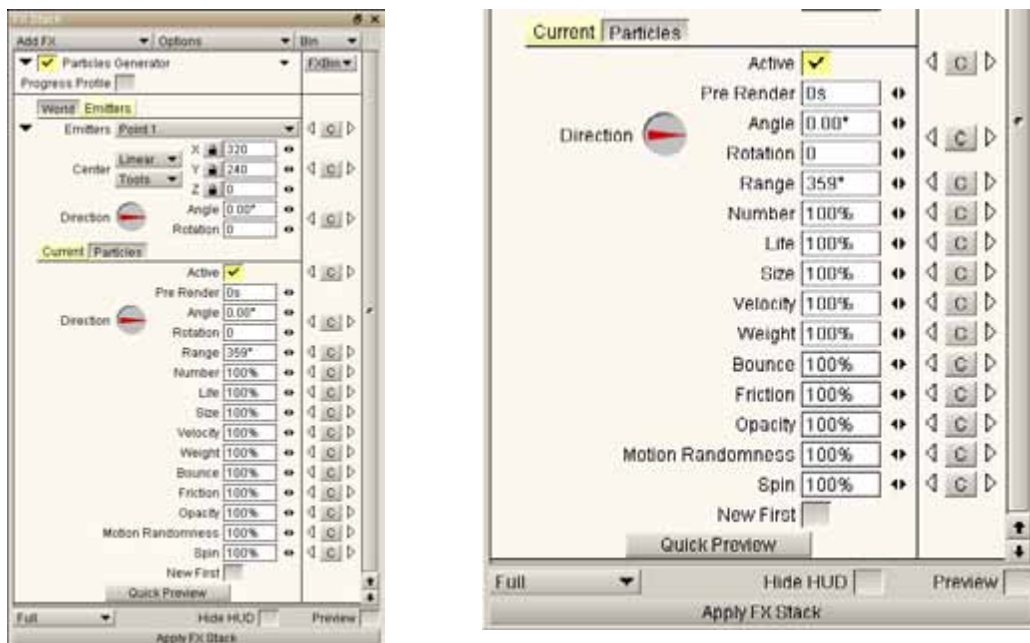
- The *Mode* menu contains some of the options already seen in the *Animation* menu above. However, these options do not apply to all consecutive elements of an animated brush, but to the colors of your particles in accordance with the color gradient chosen. The color gradients chosen to be applied to your particles will depend on the choices you make in this menu.

In the example (*party > fireworks*) the particles' color covers the entire color spectrum of your particles for as long as they live.

In the example (*party > stage lights*) the particles' color is chosen randomly and kept as long as the particles live.

The *Emitters > Current* tab

Let's take a closer look at the *Current* tab:

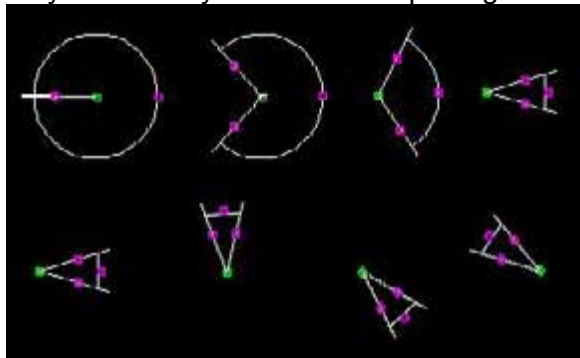


The *Active* button either displays or hides the emitter named in the *Emitters* popup menu (of course, your particle settings are retained). This function will render your task easier when working with several emitters at the same time and a large number of particles are displayed on the screen. In order to understand the way the parameters described below work, we recommend you make full use of the *Quick preview* window.

The *Pre-Render* parameter displays the particles on the screen after the number of seconds entered here have timed out.

Let's go inside the framework of a typical set of particles (*pyrotechnic* > *smoketrailc*).

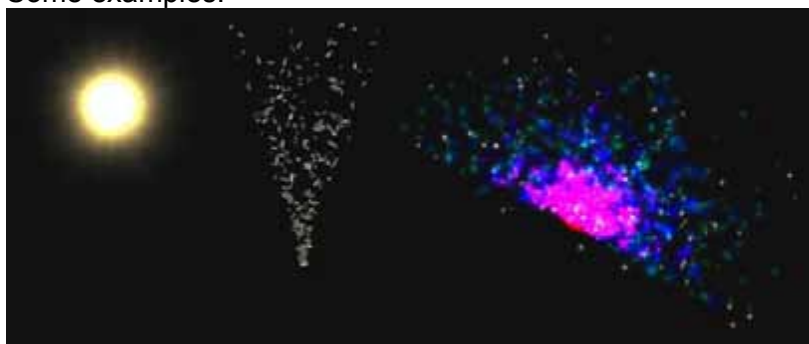
Setting the pre-render value to 10 seconds will ensure you do not see the outset of the flames as they will already be well developed right from the beginning of the animation.



The *Range* parameter is used to define the emitter opening angle. The particles bundle will then be emitted within the arc defined.

The *Angle* and *Spin* parameters are used to define the *Direction* in which the particles are ejected (see opposite).

Some examples:

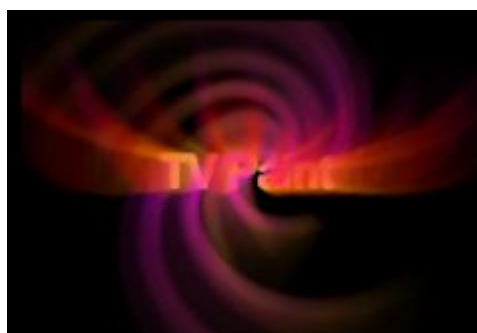


Do not confuse *Direction of emitter* and *Direction of the bundle* of particles from the emitter.

In the example opposite: the emitter is a straight line at an angle of 45° (oblique) and the direction of particles emitted is -90° (to bottom right) with an opening angle of 1°.

The *New first* check box, when checked, ensures that newly emitted particles are displayed in front of the older particles.

The result obtained with the predefined example (*text* > *titre1*) is similar to this option:



New first box not checked



New first box checked

All other parameters: *Number*, *Life*, *Size*, *Velocity*, *Weight*, *Bounce*, *Friction*, *Opacity*, *Motion randomness* and *Spin* are the same as those encountered in the *Emitters* > *Particles* > *Current* tab.

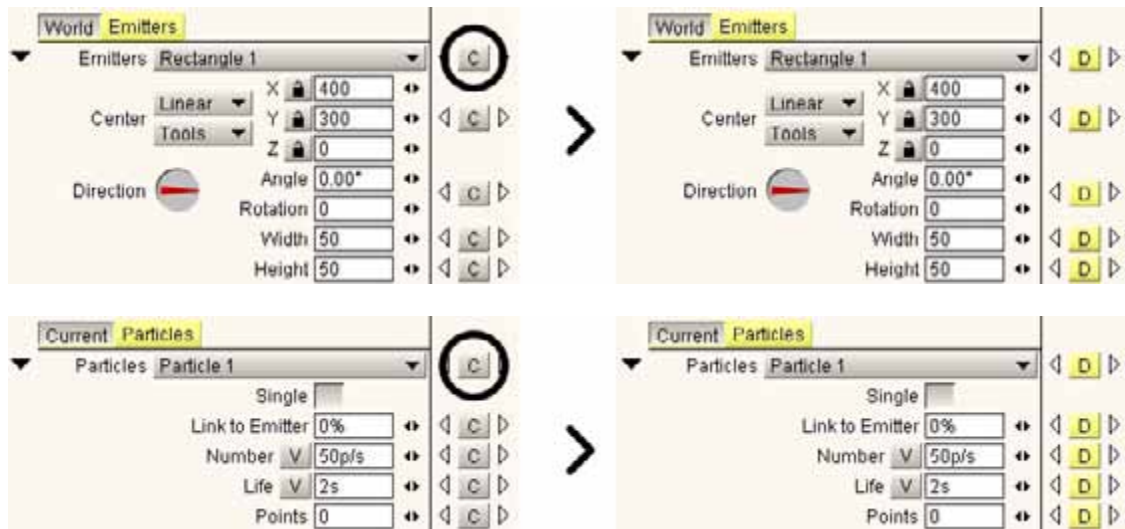
However, in this case we are dealing with «master» controllers: they are set as a percentage and have a direct influence on all particles of the emitter at the same time.

This is extremely practical when you wish to increase or decrease the size of all particles at the same time without modifying the size value for each type of particle emitted. This also eliminates the need for numerous calculations for each operation.

The use of animation keys with the master controllers often allows you to save a great deal of time.

To finish off, you may have noticed the animation key controllers next to the *Emitters* and *Particles* popup menus.

These are used to create animation keys for all parameters of the emitter or particle named in the popup menu header at the same time.



Lesson 18

The advanced functions of TVPaint Animation Pro

In this lesson, you will learn to :

- Create customised windows.
- Use the plug-ins at your disposal.
- Use the macro scripting language « George ».

Customized windows

It is possible to create your own customized panels and icons in TVPaint Animation Pro to adapt the interface to your needs.

To access the customized windows of TVPaint Animation Pro, click on the button encircled in the *Tool bar* below.

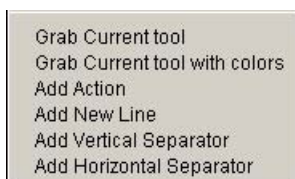


The customized windows are similar to those shown opposite: numerous icons are represented and each of them has a specific function.

By default, when you create a new customized window, the latter is empty but we will explain how to fill it later on.





A newly created panel is as shown in the image opposite and will be referred to as *Tool Bar* by default.



A RMB click in an empty area of a customized window will open the menu shown opposite.

The following options are available :

- * **Grab Current tool** allows you to save your current tool with all its settings and connections: airbrush, penbrush, custombrush, etc ... This action creates a button in the current panel. The icon of this button is the one of the tool grabbed and it provides fast access to the previously grabbed tool. Note that the option to grab the current tool is also accessible by simply pressing the  button of the *Tool Bin* panel which is present by default.
- * Grab the current tool with colors has the same effect as the previous operation except that the tool is saved with the A and B colors defined at the moment of grabbing. This option is also accessible via the  button of the *Tool Bin* panel.
- * **Add Action** or series of actions.
- * **Add new line of icons** to be filled.
- * **Add vertical and/or horizontal separators** between your icons (click with the right button on the latter to remove them ...)

Adding an action

Adding an action is done using the panel at the bottom left of this page :

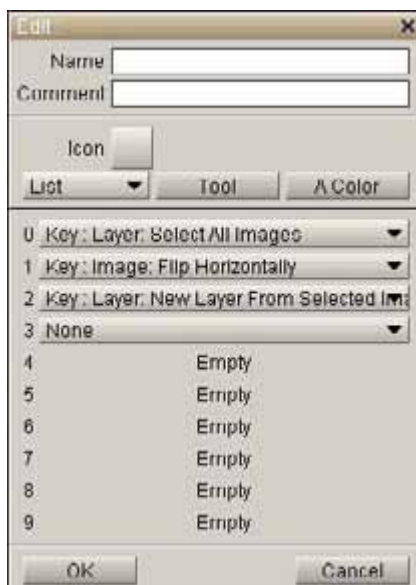
- * Using the first two text fields you may define a name and in-line help comment for your future customized function .
- * The buttons and menus *List*, *Tool* and *A color* allow you to choose the icon corresponding to the action you will create.



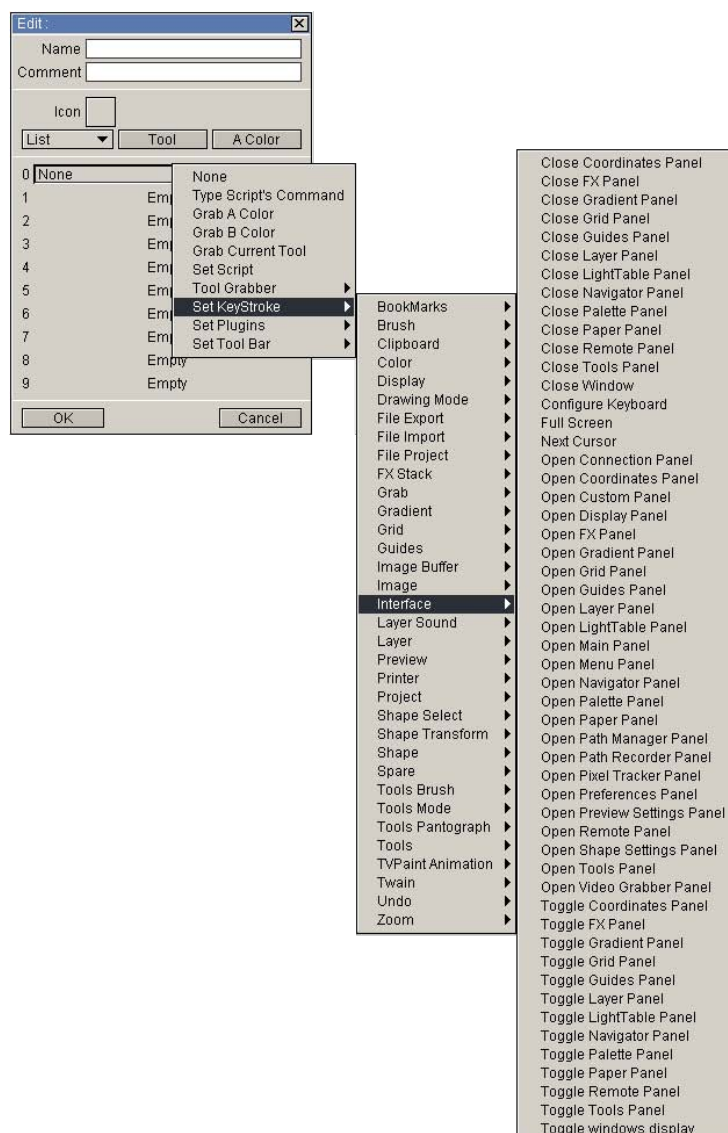
Opposite you find the list of icons supplied with TVPaint Animation Pro.

To create a new icon, you simply have to create a brush with its image and select the *Tool* button.

- * The numbered lines are the actions to be carried out one after the other when you click on the icon corresponding to your function.




Above you find the example of an action which selects all images of the current layer, flips them and copies them all to a new layer.



The actions at your disposal.

Several possibilities are available if you decide to create an action. You can :

- * Select a shortcut in the numerous program functions. (see previous page)
- * Select an FX-Bin file stored in the FX-stack to re-use it.
- * *Open Plug-in* allows you to place a button to fast-start plugins. (they will be introduced and explained in the next section of this lesson)
- * *Open panel* allows you to create dependencies between your panels, i.e. you may display secondary panels from the main panel, for example. This may be useful for organizing your custom brushes or the contents of your various *Bins*.

For example, the button  at the bottom of the *Animator Panel* is used to open the *Tool Bin* panel which is a default Bin in which your tools are saved. Nevertheless, it is possible to create a Bin for each type of drawing tool (Airbrush, Penbrush, etc.) which may be opened from the *Animator Panel* using other buttons of this type.



- * Grab the A color.
- * Grab the B color.
- * Grab the current tool, with the A color, with the B color or with those two colors.

- * You may call up a George automation script.
- * Select a script command (for example : TV_LayerAnim, TV_Circle, TV_Airbrush, etc ...)



George Scripts and commands will be discussed further in this lesson.

How to manage the created actions.

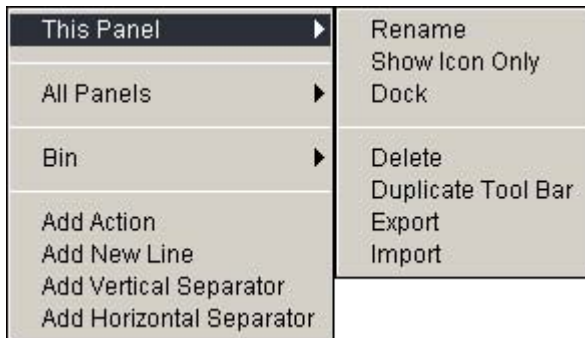
Once your buttons are created in the custom window, other options become available:

- * With a simple selection in your custom window you may cut or copy the icons/actions that you have just created. You simply use the menu described above to « paste » your icons/actions later.
- * With a right click on an icon/action in the custom window, you may edit, duplicate or delete it.

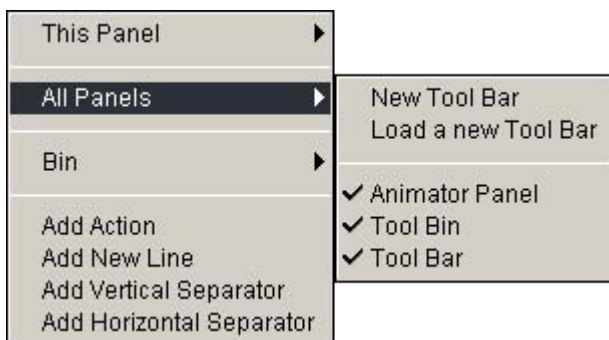


How to manage the panels.

Now we will look at the options proposed in the panels themselves. In the sub-menu shown below, which is accessible with a right click in an empty area in your custom window, you may :

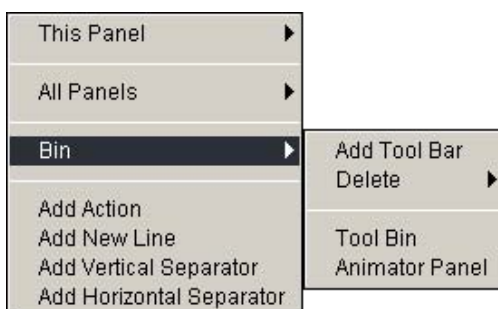


- * *Rename* the current custom window .
- * *Show icon only* (without text).
- * *Dock* your window under the tool bar (*Dock*).
- * *Delete* the current window.
- * *Duplicate* the entire window.
- * *Import / Export* the current window.



In the second sub-menu you may :

- * *New tool bar* (you may create an unlimited number).
- * *Load a new tool bar* from its .bin file.
- * *View* the name of the custom windows visible on the screen.



This last sub-menu is used to:

- * *Save* a customized window in order to re-use it later.
- * *Delete* one of the customized windows that you have just saved.



If you save the configuration, your custom windows saved under the *Bin* menu will still be present when re-starting TVPaint Animation Pro.

This being the case, a reset will delete these settings. Remember to export the custom window you need the most.



You may also define a keyboard shortcut for each action created using the keyboard shortcuts panel !

How to use the plug-ins

To use the plug-ins at your disposal, you have to :

- * Open a custom panel
- * Create a new button in this panel
- * Select the plug-in you need as action to do for this button

The panel relative to the plug-in will then be visible once you click on the corresponding button.



The *Canon* Plug-in is available only if you have selected it during the installation process of the software. It is available only on PC computers at this time.

The *Color Factory* plug-in

The *Color Factory* plug-in allows you to modify the values of the R,G,B and Alpha channels the selected images, thanks to mathematical formulas. (ie : R,G,B and Alpha values of the pixels of your images)



Based on the additive color principle, all colors are mixture of red, green and blue (more or less dark) in exact proportions.

Each color can be broken up in various ways depending on the color system. For example, the *Slider* tab of the *Color Picker* panel gives the numerical values of the A color in the R,G,B and H,S,L color systems.



Each text field of the *Color Factory* panel describes one component (R,G,B or Alpha) and can contain a mathematical formula. The new values of those components will be calculated regarding the formulas you have entered (the Alpha component indicates the opacity of the pixels).

The variables that you can use in your formulas are listed in the table below (all in low case) :

The variables :

r	Value of the <i>Red</i> component of the pixel
g	Value of the <i>Green</i> component of the pixel
b	Value of the <i>Blue</i> component of the pixel
a	Value of the <i>Alpha</i> component of the pixel
x	x coordinate of the pixel
y	y coordinate of the pixel
w	Width of the current project
h	Height of the current project

And here are listed the arithmetic operators :

Arithmetic Operators	Examples :
+ add	$18 + 3 = 21$
- subtract	$18 - 6 = 12$
* multiply	$18 * 3 = 54$
/ divide	$18 / 3 = 6$

It is possible to use parentheses () in order to set priorities in your calculations. If you don't use them, the *Color Factory* plug-in will evaluate the operations from the left to the right.

For instance : $1+2*3 = 9$ $1+(2*3) = 7$

Here are a few examples using the *Color Factory* plug-in.

* Let's begin with a classic image without any modification :



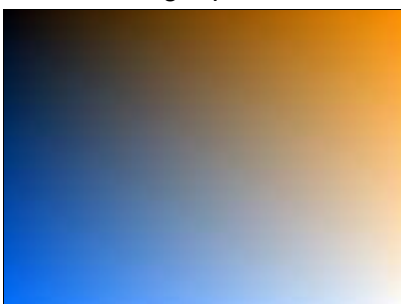
* Here is a negative of the previous landscape :



* Below, the red and blue components of the landscape have been inverted : the sky turned into orange and the road turned from red to blue. The green component stay unchanged.



* The *Color Factory* plug-in can also be used to create nice color gradients. Therefore, the formulas on the right panel below are more complicated.



* Below, simple additions have been done with the red and green color channels inverted.



* Here is the last exemple : An opacity gradient from the top right to the bottom left of the image.



The Canon plug-in (PC only)

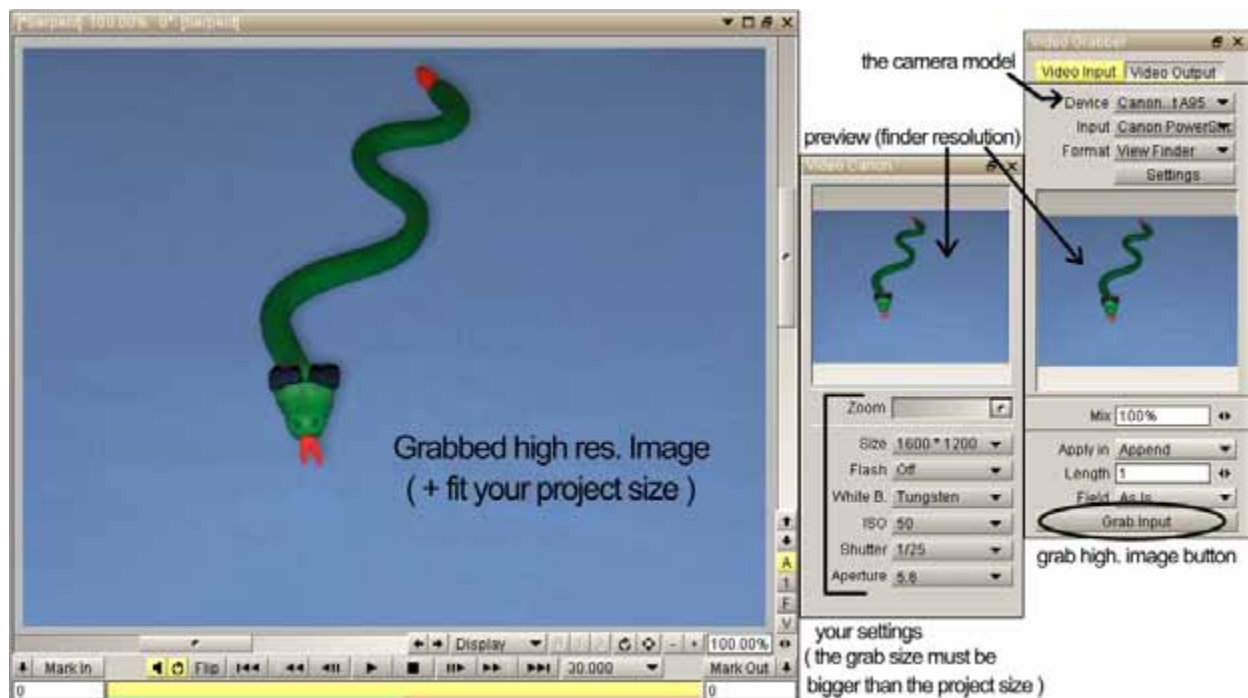
The *Canon* plug-in allows the user to retrieve photos from a Canon digital camera and to put them directly into a TVPaint Animation Pro layer.

This plug-in is very convenient for the animator who want work in stop-motion directly with the software.

Here are the steps to use the *Canon Plugin* with TVPaint Animation Pro :

* What is required :

- The Canon driver of your camera must be correctly installed in your system. (Microsoft Windows only at this time)
- You should have a compatible Canon camera (see the list in Appendix) powered and plugged to an USB port of your computer.
- You have to set your camera in *playback* mode. Don't use the *shooting* mode as it does not allow to manage your camera via the computer.



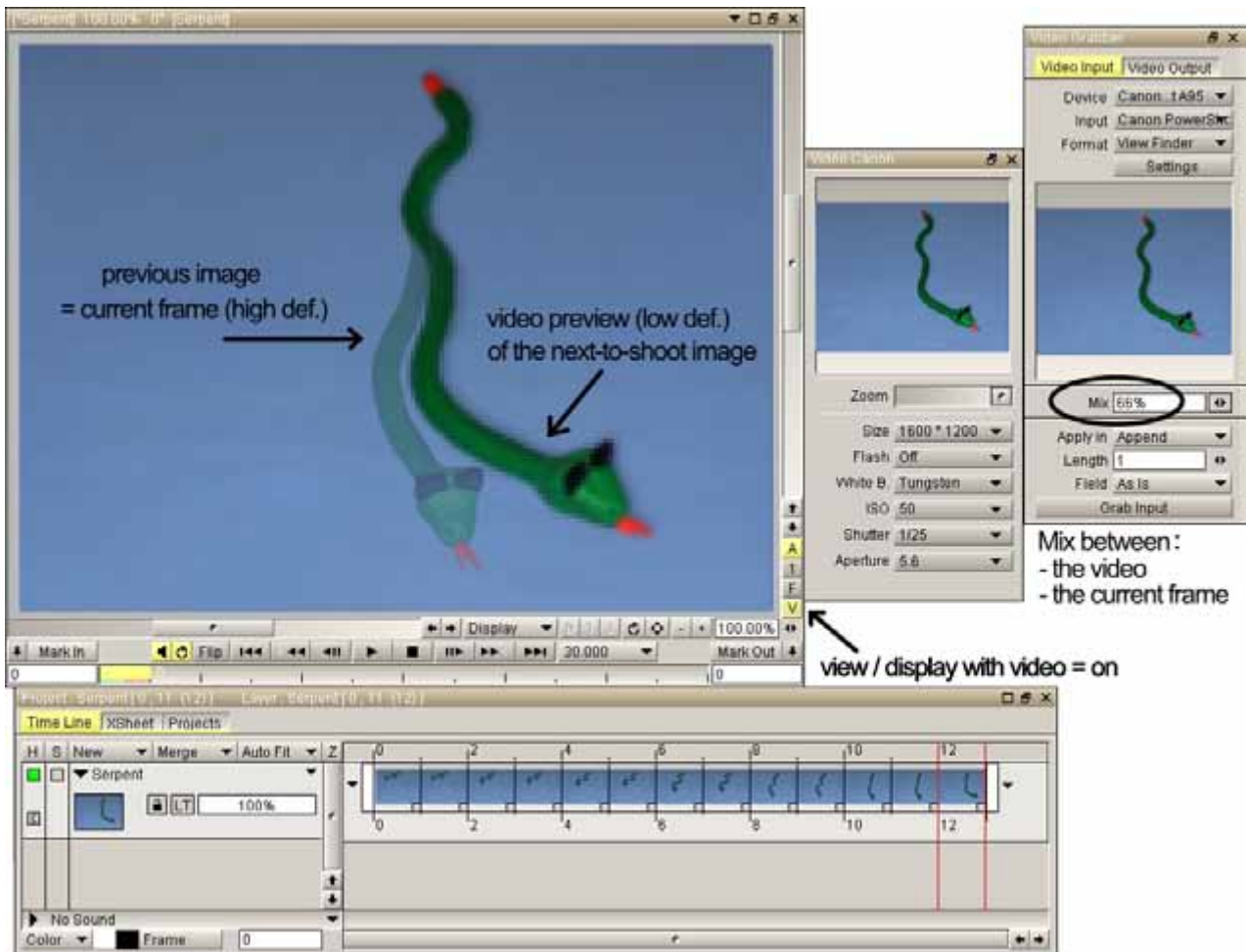
How to make it work :

- Launch TVPaint Animation Pro
- Open the *Video Grabber* panel. (It is accessible in the *Windows* main menu)
- In the device list, choose your Canon camera (if other devices are listed)
- Hit the *settings* button to access the second panel, in which you have to adjust your grab settings.
- Choose *Apply in current Layer* in the menu : so it will append the new image just after the current one in the current layer.
- When you think it looks fine in the little preview, hit the *Grab Input* button.

- A sound should ring out as soon as the picture has been transmitted. (see previous page)

Here are some useful tips :

- * To preview the next-to-shoot image (low-res. finder preview) over your last grabbed frame :
- Enable the [V] button of the project window,
- Change the *mix* parameter value. It is a percentage of visibility between the video and current-frame. (see below)



It is advised to use the effects :

Key > ChromaKeyer to delete the colored background behind your characters.

Rendered > Healing Tracker to remove all the small imperfections of your images.

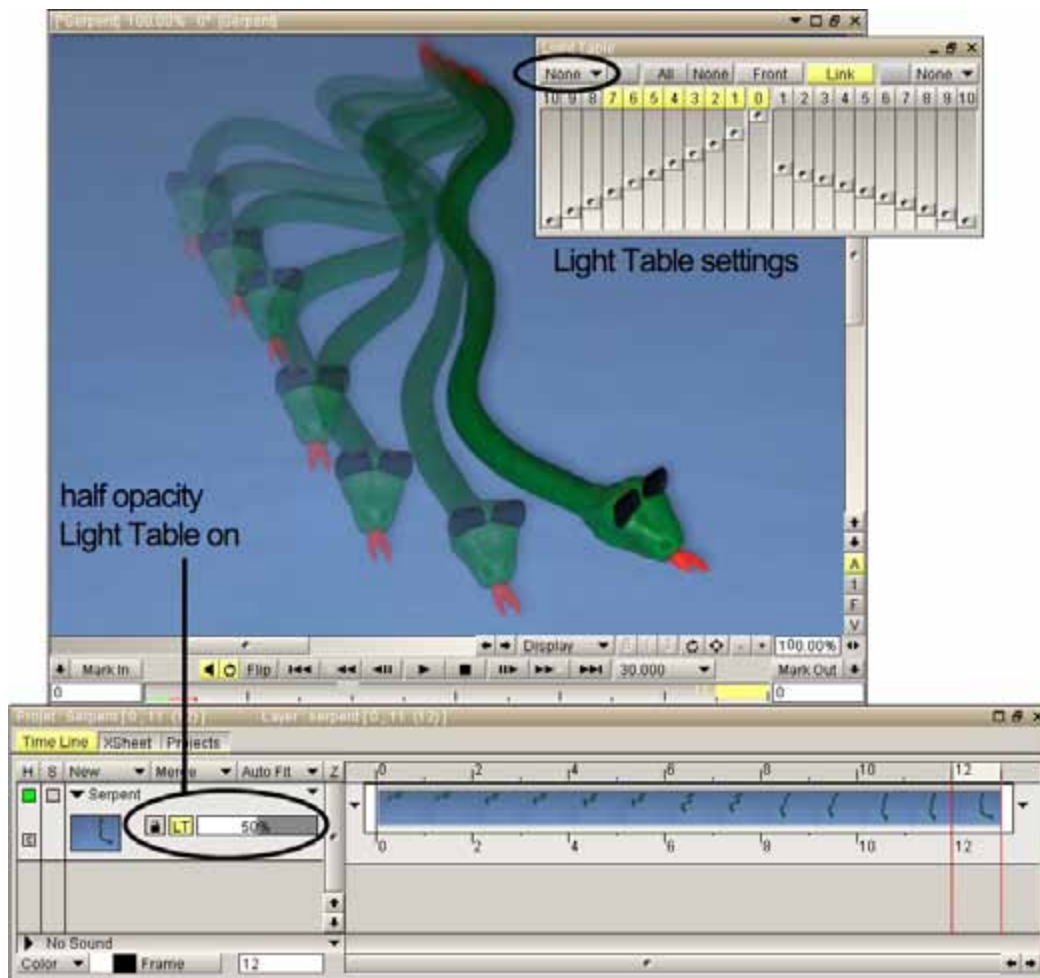
You can also shoot an empty background and put it as image layer behind the current animation layer. After this operation, you should be able, thanks to the erase drawing mode, to remove all the crutches, wedges, wires ... that you used.

- * If you want to grab a picture inside an existing sequence of images :
- Begin by selecting the image that you want to change in the timeline.
- Enable the *display with video* parameter.
- Change the *Mix* parameter value in order to compare the existing image with the camera preview.
- Once you are satisfied, click on the *Grab Input* button.
- The grabbed image is then replacing the selected image.

* To preview your animation using the *LightTable*, set the Layer opacity to half (or a bit less), set the previous frame color to *none*, and tweak the level sliders of the 1, 2, 3, ...5, 6 previous frames to make them visible. (see below)



Of course, you can have a display with the video and the *LightTable* enabled simultaneously.



It is advised always to close your Video Grabber and Video Canon panels before quitting the software.

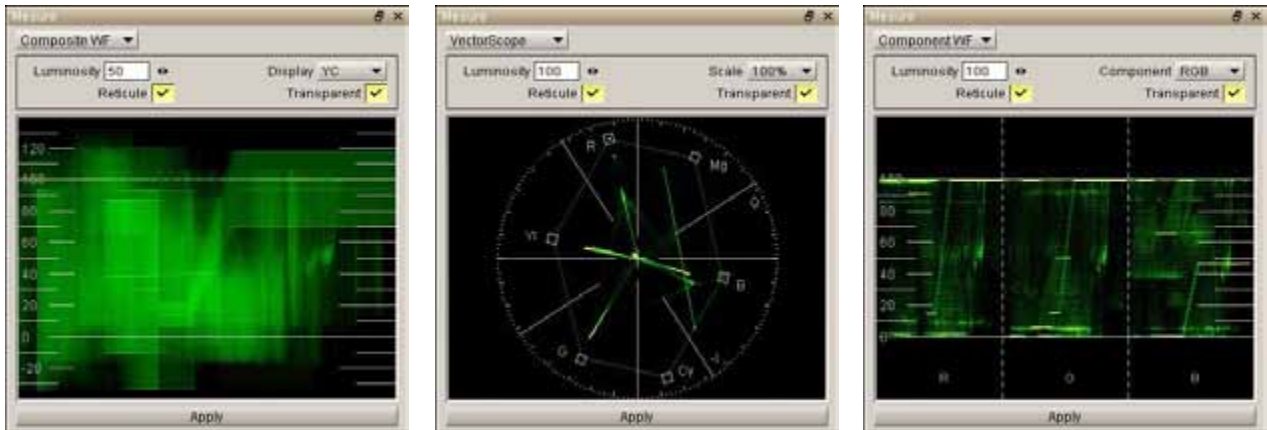
The *Direct Show* plug-in

DirectShow is an application programming interface from Microsoft which contains a set of software libraries. It is a component of DirectX and allows to manage multimedia files. The DirectShow Plug-in provides support for USB, SCSI, FireWire, ... compatible hardwares. (in theory all Windows Driver Mode (WDM) compatible hardwares)

The WaveForm plug-in

Generally speaking, an oscilloscope is an electrical equipment which allows to control and measure periodic signal voltages. If it is calibrated in order to receive video signals, it is also called WaveForm monitor.

In the audiovisual environment, they are often used to check if the transmitted video signal has its characteristics in conformity with the applicable broadcasting rules.



Our WaveForm Plug-in allows the audiovisual professionals to use their classical tools. Thanks to this Plug-in, it is now easy to check the integrity of a signal, manage calibration and colorimetric adjustments, control the validity of numerical signals, ...

The popup menu allows you either to select :

- * A Composite WaveForm monitor
- * A Component WaveForm monitor
- * A VectorScope



The monitors at your disposal in this WaveForm Plug-in act as if all layers of the current picture were merged.

Here are some options relative to the different displays at your disposal :

- * The VectorScope can use two calibration sets : 75 % and 100 %
- * The component WaveForm monitor can use the R,G,B or Y,U,V systems.
- * The composite WaveForm monitor can use luminance and/or chrominance signal(s).

Let's now explain the other options :

- * It is possible to set the *luminosity* of the display thanks to a mini-slider.
- * The *reticule* button allows to show or hide the different axis and channels.
- * The *apply* button allows to copy on the current image the results obtained in the WaveForm Plug-in panel.
- * If the transparency button is checked, the black background will not appear when using the *apply* button.

How to use the « George » scripting language

Introduction: what is George ?

George is a programming language which allows to use the numerous tools of TVPaint Animation Pro. Every program written in this language is called “*George Script*”. Other softwares use sometimes the word “Macro” instead of “Script”.

A *George Script* allows to execute specific TVPaint Animation Pro command such as : Create a new layer, draw a circle on this area, save the current project, add a bookmark, etc...

Those *Scripts* are usually created to save some time when executing a repetitive task is needed. Experienced programmers use TVPaint commands in order to create “.dll ” plug-ins

Some *George Scripts* are available as example with the software, but you can also create your own scripts and/or exchange them with some members of the TVPaint Community. (You can access to the TVPaint forum here: <http://www.tvpaint.com/forum/index.php>.)

Finding, Editing and Using George Scripts

After installing TVPaint Animation Pro on your computer, *George Scripts* are located in the directory:

**C:/program files/TVPaint Animation Pro/George
Application/TVPaint Animation Pro/George**

For Microsoft Windows users
For Apple OS-X users

Those *George Scripts* are in fact usual ASCII text files and have a “.grg” extension. It is possible to edit or create them with any text editor like *Notepad* from *Microsoft Windows* or *Text Edit* from Mac OS-X

The scripts are in theory working on the both standards PC and Macintosh, whatever the computer was used to create them.



To use one of the *George Scripts* at your disposal, just follow the steps below:

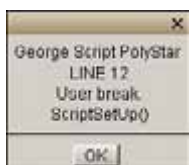
open a custom panel

create a new button on this panel

select the action: *-select a script-* for this button

select a file with a “.grg” extension in the file requester

Once finished, if you click on the just created button, the *George Script* will then be launched.



At every moment, you can stop the execution of a *George Script* by using the [Esc] key.

A window, indicating on which line the execution of the script was stopped, should popup.

Once a *George Script* has finished its programmed tasks, the *Undo* option of the TVPaint Animation Pro main panel allows to cancel all the changes it has generated.

A few examples of George Scripts

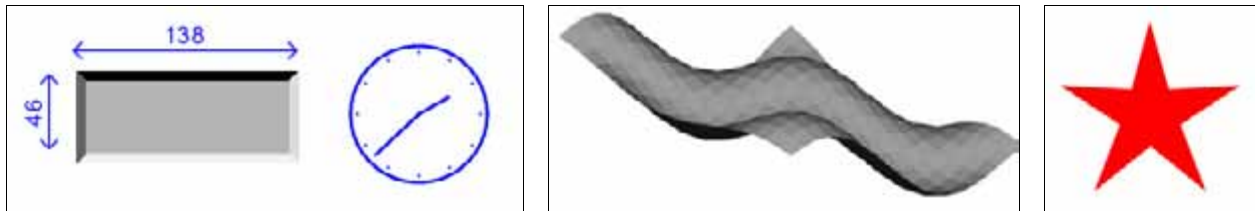
Often, *George Scripts* need an action from the user in order to be launched. For instance :

The *George Script* named "*long.grg*" waits for a segment to be drawn on screen and finally returns its length.

The *George Script* called "*clock.grg*" waits for a circle to be drawn on screen and finally draws a clock inside this one.

The *George Script* called "*button Z.grg*" waits for a rectangle to be drawn on screen and returns a bevelled button inside it

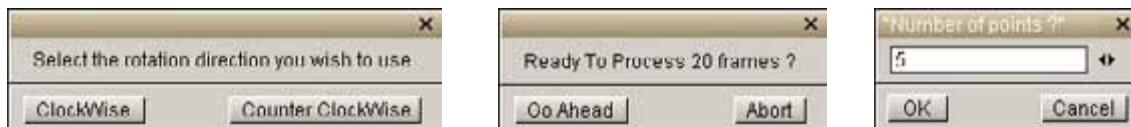
A few *George Scripts* don't need any action from the user to be started: it's the case with the *George Script* called "*Zsurface.grg*".



Above: the results of the scripts: button Z, Long, Clock, Zsurface and Polystar

A few *George Script* are more complicated and some requesters may appear.

It is the case with the *George Script* called *Polystar.grg* : during its execution, a first requester asks you to specify how many vertices should be drawn. If you apply your script on an animated layer (after selecting all its frames), a second and third requesters will ask you more informations (see below)



Programming in George language

George is a scripting language which can do the basics:

- Loops (do the same thing n times),
- Conditional testing (if this is true then do that),
- Calculations ($a+b$, $\sin(a)$,...).

The George language is not particularly fast, but it is flexible and very easy to use. On many points, George is comparable to the Pascal language or other well known programming language.

However it's not aimed at developing heavyweight applications as are for example the C or C++ languages. George is first and foremost a scripting language.

Instructions and Commands

George needs classical instruction to structure the scripts: tests, loops, calculation, conditionals events, etc... For a better readability, all the instructions will be written in green in this manual.

For example :

If, Else, End, For, Do, Until, While, ... for conditionals tests
Cos, Sin, Tan, Rnd, ... for calculations

You can also call in your scripts TVPaint Animation Pro commands, which call specific tools of the software.

They can be differentiated from the classical George instruction because they all begin with the « **tv_** » prefix. (They will be written in blue color)

For instance :

- * The command **tv_layerCreate** allows to create a new layer.
- * The command **tv_SaveBrushAnim** saves the current brush on the hard drive.
- * It is possible to change the colors of the bin tab thanks to the **tv_SetPalette** command
- * Etc... (You will find in appendix the complete instruction and command listings of the George Language.)

All TVPaint commands need their own arguments and return some values as answer. For example, the TV-LayerCreate command needs a name for the layer that you want to create. This command returns some information regarding your layer: opacity, number of pictures, place of the timeline,... So you can reuse or modify them.

It would be too long to enumerate here the arguments and the return values of each George command. All those parameters are fully explained in the developer kit (SDK) of TVPaint Animation Pro. The SDK is available on demand at the email address: tvpaint@tvpaint.fr



Make sure to differentiate George instructions (which often start with a sharp : #) and George commands for TVPaint Animation Pro (which allways start with the « **tv _** » prefix).
The commands act on the software itself and on your current display whereas George instructions are used to write the structure of the program (conditionnals, calculations, loops, ...)



Since approximatively 10 years, all the softwares using the TVPaint technology offers a scripting language.
Here are some informations regarding the compatibility between those scripting language : If you upgraded to TVPaint Animation Pro, your old scripts should still work.
However, some recent commands (for instance: **TV_AddBookmarks**) are not available in older products using the TVPaint Technology. (Aura, Mirage,...)

An example of program written in George.

The program on the next page comes from the file clock.grg. It allows to draw a clock displaying the current time on the project window.

We suggest you to create a button assigned to this script in a custom panel, as explained below. After this operation, it should be easy for you to test this *George Script* in the project window.

Once this stage is passed, you can try to edit the *George Script*, to modify it and to test it again in TVPaint Animation Pro. This should help you to learn the basics of the George Language.



The best way to get used to George scripts is probably to try the example programs that come with TVPaint Animation Pro.
Study them and make small alterations to them, then run them and see the effects of your changes.

The *clock.grg* script :

```

Param Circle
    // TVPaint should wait for the coordinates of a circle before running the
    // program. The user must therefore draw a circle to start the program.

Parse result command x y r button
    // Fetches the coordinates of the user's circle.

if cmp(command,"Circle")==0
    tv_Warn "This program needs the coordinates of a circle !"
    exit
    // If there are no coordinates for a circle, warn the user and end the program.
End

t=time
parse t h m s
    // Fetches the hours (h), minutes (m) and seconds (s) of the current time.
m=m+s/60
    // The seconds can slightly alter the minutes arm of the clock.
tv_Pen r/30
    // Selects a pen proportional to the clock size.
tv_Circle x y r
    // Draws the outline of the clock.
ang=360/12
d=r-(r/10)
#for i=0 to 360-ang step ang
    // Loop to draw the 12 hour markers on the clock
    #a=cos(i)*d
    #b=sin(i)*d
    tv_Dot x+a y-b 0
#end

i=h*360/12
    // Draw in the hours
d=r/2
a=sin (i)*d
b=cos (i)*d
tv_Line x y x+a y-b

i=m*360/60
    // Draw in the minutes
d=r-(r/8)
a=sin(i)*d
b=cos(i)*d
tv_Line x y x+a y-b

    // End of the example

```

And below, a few clocks which were drawn with the script



Commands Description

Here are some information regarding the commands that you can find on the previous page :

Below, each command will be followed by the syntax of the variables it requires.

For example, to draw a straight line from one point to another, you must give the coordinates of the start point then the end point.

The syntax to draw such a line would be:

tv_Line **x1 y1 x2 y2** [0/1]

The [0/1] parameter indicates that you can use either the left [0] or the right [1] mouse button. This is optional; by default, it's always the left button that will be used.

To summarize :

[] Variables inside square brackets are optional.

/ The “/” symbol separates several options of which only one is used.

For instance, 0/1 means either 0 or 1.

tv_Circle **x y r** [0/1]

This command allows to draw a circle with a radius *r* and a center located on the pixel with (x,y) coordinates. The [0/1] parameter indicates that you can use either the left [0] or the right [1] mouse button.

Of course, the circle will be drawn on the current image on the current layer.

tv_Dot **x y** [0/1]

this command allows to use the current tool (airbrush, pen, custombrush,...) on the pixel with (x,y) coordinates, in the current image on the current layer.

The [0/1] parameter indicates that you can use either the left [0] or the right [1] mouse button.

tv_Warn **text**

This command displays a popup dialog box containing the character string **text** and an “ok” button. The character string must be surrounded by quotation marks.

tv_Pen **size**

This command allows to select the pen tool with its current parameters (drawing mode, opacity, power, ...) and change its size.



You should always remember that a George Script will use TVPaint Animation Pro as it finds it, i.e. with the functions and options that are currently set.

For instance, if you want to draw a red line with a George Script, the script needs to be told more than just the line coordinates. Unless you explicitly tell it to use a red color, your script will go ahead and use the current color when the script is run, whatever it may be.

Similarly, if when you run the script it is in the *Behind* or *Colorize* drawing mode, you won't exactly be getting the clean line you were hoping for.

A few useful options

It is now time to explain some programming conventions:

1°) A sharp character # at the beginning of a line will not affect the execution of the script.
For instance, the line :

```
Pause 20
```

will pause the execution of your script during 20 seconds.
And the following script line will have the same result :

```
#Pause 20
```

2°) You can use only one instruction or command on the same line. For instance, if you use the following line in a script :

```
Print "wait a little" Pause 20
```

An error message will be returned.
The two lines below will not return any error messages :

```
Print "wait a little"  
Pause 20
```

3°) Everything on a line that is after a double slash // is ignored. They are only comments that have been put into the script to make it more understandable and readable by humans. For instance, the line :

```
Pause 20 // wait 20 seconds
```

makes TVPaint Animation Pro wait during 20 seconds.
However, the line :

```
// Pause 20
```

will not pause the execution of your script.



TVPaint Animation Pro sees no difference between uppercase and lowercase letters. For instance, **TV_layercreate**, **tV_LaYeRcReAtE**, **tv_LAYERCREATE** are all exactly the same command.

How to use the variables

It is not necessary to declare the types of your variables in a George Script.
For instance, you can write the two lines below in a script without declaring that the variable *MyNumber* is numeric or the variable *Answer* boolean.

```
MyNumber=10  
Answer=false
```



As for commands and instructions, the George language sees no difference between uppercase and lowercase letters. For instance, *MyNumber*, *mynumber*, *MYNUMBER*, *MyNuMbEr* are all exactly the same variable.



The George language use a few reserved variables in order to work correctly. You can use them as you wish, but it is not advised to modify them.

That is the case with the two variables « *Time* » and « *Result* » (encountered in the *clock.grg* script above) which contains respectively the current time and the control results of the last used George command.

The operators at your disposal

Opérateurs Arithmétiques	Exemples :	
- negative	18 ->	-18
** exponent	18**3=	18*18*18=5832
* multiplication	18*3=	54
/ division	18/3=	6
+ addition	18+3=	21
- subtraction	18-6=	12
Opérateurs Logiques	Exemples :	
&& et	a&&b	
ou exclusif	a b	
Opérateurs Apparentés	Exemples :	
== equal	x==6	x==x+2
!= not equal to	x!=5	x!=y-3
> greather than	x>4	x>y-z
>= greather or equal than	x>=3	x>=z/y
< less than	x<8	x<-y
<= less or equal than	x<=7	x<=x+5

The « = » operator is an assignment operator and allows to assign a given value to the variable of your choice. For example :

```
MyNumberOfLayers=5
```

The « == » operator is an comparison operator between two variables, usually used during conditionnal tests. For example :

```
if a==5
```

The comparison operator is not appropriated if want to know if two variables are equal. For this, you need to use the instruction **cmp**, as shown in the *clock.grg* script above :

```
if cmp(command,"Circle")==0
```

The **Param** and **Parse** instructions, the launching modes.

The instruction **Parse** allows to split up a character string into smaller character strings

```
Rainbow="red orange yellow green blue indigo violet"
Parse Rainbow color1 color2 color3
tv_warn color1      // displays « red »
tv_warn color2      // displays « orange »
tv_warn color3      // displays « yellow green blue indigo violet »
```

Usually, each *George Script* begins with the **Param** instruction. It allows to choose which action will have to be done by the user in order to start the script execution : drawing a circle, a segment, a rectangle ...

* The script line :

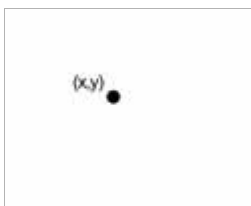
```
Param None
```

allows the *George Script* to be executed without waiting for an user action.

* The two script lines :

```
Param Single
Parse result command x y button
```

allows to execute a *George Script* after a simple mouse click on the project window.

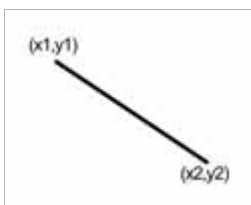


- The character string « single » will be assigned to the variable called *command* if a point is drawn on the screen.
- The point coordinates will be assigned to the variables *x* and *y*.
- The button selected by the user to place the point will be assigned to the variable called *button*. (1 for RMB, 0 for LMB).

* With the following script lines :

```
Param Line
Parse result command x1 y1 x2 y2 button
```

The *George Script* will be launched only if a segment is drawn on the project window.

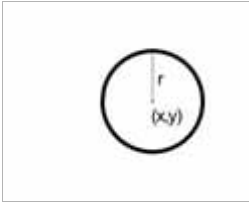


- The character string « Line » will be assigned to the variable called *command* if a line is drawn on the screen.
- The coordinates of the points at the ends of the segment will be assigned to the variables *x1 y1* and *x2 y2* (see opposite)
- The button selected by the user to place the point will be assigned to the variable called *button*. (1 for RMB, 0 for LMB).

* With the two script lines below :

```
Param Circle
Parse result command x y r button
```

The *George Script* will be launched only if a circle is drawn on the project window.

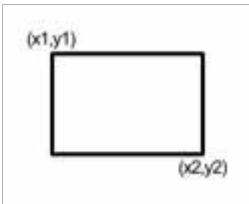


- The character string « *Circle* » will be assigned to the variable called *command* if a circle is drawn on the screen.
- The coordinates of the circle center will be assigned to the variables *x* and *y*.
- The radius of the circle will be assigned to the variable *r*.
- The button selected by the user to draw the circle will be assigned to the variable called *button*. (1 for RMB, 0 for LMB).

* With the following script lines :

```
Param Rectangle
Parse result command x1 y1 x2 y2 button
```

The *George Script* will be launched only if a rectangle is drawn on the project window.

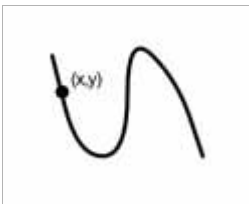


- The character string « *Rectangle* » will be assigned to the variable called *command* if a point is drawn on the screen.
- The coordinates of the points at the ends of the rectangle will be assigned to the variables *x1 y1* and *x2 y2* (see opposite)
- The button selected by the user to draw the rectangle will be assigned to the variable called *button*. (1 for RMB, 0 for LMB).

* With the two script lines below :

```
Param Freehand
Parse result command x y button
```

The *George Script* will be launched only if a freehand curve is drawn on the project window.



- The character string « *Freehand* » will be assigned to the variable called *command* if a curve is drawn on the screen.
- The button selected by the user to draw the curve will be assigned to the variable called *button*. (1 for RMB, 0 for LMB).

The character strings

It is important to know how to use the character strings because they usually plays a part in numerous situations.

For example, in the following script lines, a loop allows to load the projects :

D:\cartoon3.tvp, D:\cartoon4.tvp, D:\cartoon15.tvp, D:\cartoon16.tvp.

```
For number=3 to 16
    NameOfTheFile="D:\cartoon"number'.tvp'
    tv_loadproject NameOfTheFile
End
```

As shown above, you will have to use simple quotation marks ('...') or double quotation marks ("...") in order to differentiate variables from character strings.

In the example above :

<i>number</i> and <i>NameOfTheFile</i>	are variables
<i>D:\cartoon</i> and <i>.tvp</i>	are character strings

The variable **NameOfTheFile** receive the concatenation of **D:\cartoon**, **number** and **.tvp**. In other words, the character strings **d:\cartoon** and **.tvp**, the variable **number** have been joined end to end in order to create the variable **NameOfTheFile**.



It is possible to use the **Concat** instruction to join end to end character strings and/or variables. The following lines have the same effect :

```
NameOfTheFile=number'.jpg'
NameOfTheFile=Concat(number,.jpg)
```

If you need to use simple quotation marks ('...') or double quotation marks ("...") in your character strings, you must surround them with the other quotation marks at your disposal, as shown in the example below :

```
Print ' My preferred animation program is " TVPaint Animation Pro ' '
           // will surround the name of the software with double quotation marks.
Print " My preferred animation program is ' TVPaint Animation Pro ' "
           // will surround the name of the software with single quotation marks.
```

The arrays

As in other programming languages, George can create and use arrays with one, two or more dimensions.

To create an array, you only need to add parentheses or square brackets after the name of a variable. You can use either parentheses or square brackets.

For instance,

MyArray(i) ou MyArray[i] represent the same array with one dimension.

MyArray(i,j) ou MyArray[i,j] represent the same array with two dimensions.

MyArray(i,j,k) ou MyArray[i,j,k] represent the same array with three dimensions.

And so on ...



With the George language, it is not necessary to indicate or declare the dimension or the number of elements before using an array.

In the exemple below, an array called *color* with one dimension was created.

It contains four elements : "Magenta", "Cyan", "Yellow" and "Black"

We used a loop to display its content.

```
color[1]="Magenta"
color[2]="Cyan"
color[3]="Yellow"
color[4]="Black"

For i=1 To 4
    tv_warn color[i]           // displays each color : "Magenta", "Cyan", "Yellow"
                                // and "Black", in a dialog box.
End
```

Functions and procedures

Let's assume that you are writing a script which needs some instructions, conditionnal tests, etc ... to be executed several times. (For instance, a script which tests the pixel's colors several time and acts differently depending on the obtained results.)

Reccopying the same lines several time in a George Script can quickly become fastidious. It doesn't make the things easier when you need to check or modify your script. That's the reason why writing procedures and functions is very convenient :

* A function is a set of instructions and commands which allows to execute a precise task inside a George Script. The functions are independent from the the remainder of the George Script and are located at the end of the script.

The part of a George Script which distincts itself from the function(s) will be called "main part of the script". All the functions are available at any moment in order to be used by the Main part of the script. A function can receive parameters and always returns a result.

* A procedure is a function which does not return results.

Here is an exemple of a script using a function :

(Of course, using functions is really usefull when you have to create bigger and more sophisticated scripts)

```

Param Single
Parse result command abscissa ordinate button
tv_warn TestBlackColor(abscissa,ordinate)

// Main part of the script ▲
// -----
// Function ▼

Function TestBlackColor(x,y)
  Local r g b alpha sum
  tv_getpixel x y
  Parse result r g b alpha
  If alpha<>0
    sum=r+g+b
    If sum==0
      Return " the pixel's color is black "
    Else
      Return " the pixel's color is NOT black "
    End
  Else
    Return " the pixel is transparent "
  End
End

```



The line :

tv_warn **TestBlackColor**(abscissa,ordinate)

Can be replaced by the two following lines :

Answer=**TestBlackColor**(abscissa,ordinate)

tv_warn Answer

Here is the syntax of the instructions relative to the procedures and functions :

Function **NameOfTheFunction (Variable1, Variable2, Variable3, etc ...)**

This instruction declares the existence of a function or a procedure in a George Script. (there is no instruction called « procedure »)

This instruction is followed by the procedure or function name, and then by the name of the variables (from the main part) that are needed.



Functions and procedures must always be located after the main part of your script.

Calling a function or a procedure in the main part of your script can be done by writing its name and the needed variables between brackets, separated by commas.

Local **LocalVariable1, LocalVariable2, LocalVariable3, etc ...**

This instruction allows to specify the variables which will be used solely inside your function or procedure.

Return Result

This instruction allows to specify the result of your function and to make it available in the main part of the script. It could be a character string, a numerical value, a boolean value, etc ...

In the main part of your script, it is possible to save it into a variable, and after to re-use it.

This instruction is optional. If you don't use it, you have created a procedure instead of a function.

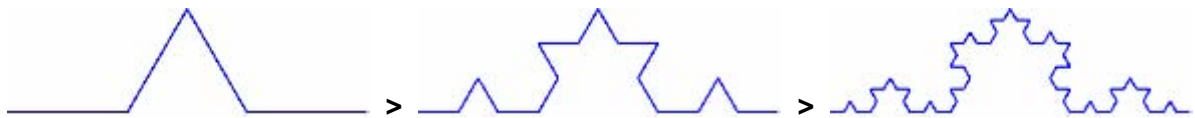
End

This instruction is needed to finish your function or procedure.



The functions and procedures written in George language can be recursive. In other words, a function can call itself. It allows to create more sophisticated scripts.

For instance, drawing a fractal curve can be done thanks to a recursive script (see below)



How to create libraries of functions and procedures.

We have just seen in the last chapter that it was possible to create your own George functions and procedures.

This may be taken even further as you can store your functions and procedures in «.grg» files and you can re-use them in other scripts written in George.

In other words, you can create your own libraries.

To insert one of your libraries in a George Script, you only have to write the following line in your script :

```
#Include "MyLibrary.grg"
```

The instruction **#Include** will search the file called *MyLibrary.grg* in the directory containing the current George Script or in the root directory of TVPaint Animation Pro

The following line allows to specify a more precise access path, from the basis directories :

```
#Include "MyFolderOfLibraries/MyLibrary.grg"
```



Please read the **Initialization File** section in the appendix of this user-manual if you want to change the root directory of TVPaint Animation Pro.

Two examples of libraries are available in the directory :

C:/program files/TVPaint Animation Pro/George/Include for *Microsoft Windows*.
Applications/TVPaint Animation Pro/George/Include for *Apple OS-X*.

They are called *Basic.grg* and *Advanced.grg* and are related to character strings management.

To make them available in the George Scripts given with the software, you only need to add the following lines at the end of those scripts :

```
# Include "include/basic.grg"
# Include "include/advanced.grg"
```

The *Startup.grg* file

At startup, the first thing that TVPaint Animation Pro does (after displaying the main toolbox, but before giving control to the user) is to run the *Startup.grg* script (which should be in the same directory as the other scripts).

When there is no *Startup.grg* file, nothing will happen. Otherwise, you have at your disposal a startup file that gets run every time you load TVPaint Animation Pro.

If, for example, you rename the *Logo.grg* file to *Startup.grg*, it will load the TVPaint Développement logo to screen every time you run TVPaint Animation Pro.

You could also, thanks to a simple George script, define all your preferred parameters. For instance : load a project from your harddrive, change the current colors, add some layers to your project, etc...

The TVPaint Animation Pro Plug-in development

As explained before, George is not the only program that can send commands to TVPaint Animation Pro.

Any other program could theoretically do so. Examples using an Excel script, a C program or other languages are certainly conceivable.

Besides, it is possible for experienced users or third-party companies to create *Plug-ins* that can be used with TVPaint Animation Pro.

Those *Plug-ins* allows to add customized tools to the software like effects on pictures, new drawing modes, new tools or new functions.

The Plug-in may be in the « .dll » (*Dynamic Link Library*) file format, which can be obtained thanks to a compiler. « .dll » files are not readable in a text editor, unlike the classical George Scripts.

For more details about this subject, please visit the TVPaint Développement forum. You can also ask us the development kit (also called SDK) at the email address : typaint@typaint.fr

This kit contains source codes for interface functions, documentation and some detailed plug-in examples.

Adding arguments

You can add arguments to the execution of TVP Animation Pro. These arguments are :

- images (just write the path and file name),
- scripts (syntax: script=PathAndFileName.grg),
- commandes george (syntax: cmd=GeorgeCommand).

For example :

TVP Animation.exe "MyImage" "script=MyScriptPathAndName.grg" "cmd=MyGeorgeCommand"

Appendix

- The video cards compatible with TVPaint Animation Pro.
- The digital camera working with the Canon Plug-in.
- The George commands and instructions.
- The export file formats.
- The available keyboard shortcuts.
- The initialization file.
- The technical support and Resources.

The video cards compatible with TVPaint Animation Pro

For both video input and/or output, some video cards are compatible with TVPaint Animation Pro : Here is the complete list, with all the features detailed (only for PC at this time) :

Hardware Model	Native file format	Video Output			Video Input	
		Possibility to view your work on TVPaint Animation Pro and the video hardware	Needs a rendered preview before being available on the video hardware	The current project window (with opacity values) can be keyed over a live video	Image grabber option	Possibility to display the current video in the project window
Leitch VelocityQ	.dps	✓	✓	✗	✗	✗
Leitch Velocity HD	Should be added in the next updates of TVPaint Animation Pro					
DPS PAR PVR Hollywood	✗	✗	✓	✗	✗	✗
Matrox DigiSuite DigiSuite LE DigiSuite DTV	.avi	✓	✓	✓	✗	✗
Newtek VTNT VT[2] VT[3]	.rtv	✓	✓	✓	✓	✓
DV compatible with OHCI 1394	.rtv	✓	✓	✗	✓	✓
WDM Web Cam Digital Camera	✗	✗	✗	✗	✓	✓
Bluefish 444	quicktime avi cineon	✓	✓	✗	✗	✗
Bluefish 444 HD	Should be added in the next updates of TVPaint Animation Pro					



= Available



= Not available



The hardware native file formats, if they are available, are used by TVPaint Animation Pro and your video card during the video import and/or export process.

The digital camera working with the Canon Plug-in (PC only)

Please find below the list of theoretically supported models regarding the canon SDK we used for this plugin (PC only at this time)

PowerShot A10, PowerShot A20, PowerShot A30, PowerShot A40, PowerShot A60, PowerShot A70, PowerShot A75, PowerShot A80, PowerShot A85, PowerShot A95
 PowerShot A100, PowerShot A200, PowerShot A300, PowerShot A310, PowerShot A400, PowerShot A510, PowerShot A520
 PowerShot S10, PowerShot S20, PowerShot S30, PowerShot S40, PowerShot S45, PowerShot S50, PowerShot S60, PowerShot S70
 PowerShot S100, IXY DIGITAL, DIGITAL IXUS
 PowerShot S110, IXY DIGITAL 200, DIGITAL IXUS v
 PowerShot S200, IXY DIGITAL 200a, DIGITAL IXUS v2
 PowerShot S230, IXY DIGITAL 320, DIGITAL IXUS v3
 PowerShot S300, IXY DIGITAL 300, DIGITAL IXUS 300
 PowerShot S330, IXY DIGITAL 300a, DIGITAL IXUS 330
 PowerShot SD100, IXY DIGITAL 30, DIGITAL IXUS II
 PowerShot S400, IXY DIGITAL 400, DIGITAL IXUS 400
 PowerShot SD10, IXY DIGITAL L, DIGITAL IXUS i
 PowerShot SD110, IXY DIGITAL 30a, DIGITAL IXUS IIs
 PowerShot S410, IXY DIGITAL 450, DIGITAL IXUS 430
 PowerShot S500, IXY DIGITAL 500, DIGITAL IXUS 500
 PowerShot SD20, IXY DIGITAL L2, DIGITAL IXUS i5
 PowerShot SD200, IXY DIGITAL 40, DIGITAL IXUS 30
 PowerShot SD300, IXY DIGITAL 50, DIGITAL IXUS 40
 PowerShot SD400, IXY DIGITAL 55, DIGITAL IXUS 50
 PowerShot SD500, IXY DIGITAL 600, DIGITAL IXUS 700
 PowerShot G1, PowerShot G2, PowerShot G3, PowerShot G5, PowerShot G6
 PowerShot Pro90 IS
 PowerShot S1 IS, PowerShot S2 IS
 PowerShot Pro1



The **EOS** class of digital cameras are not supported at this time.

The George instructions

Here is the complete list of George instructions :

abs	date	parse	version
acos	do...until	pause	while
asin	exit	print	concat
atan	len	rnd	for...to...end
break	for	sin	function
char	if...else...end	sqr	local
cos	max	tan	return
cmp	min	time	while...end
cut	param	trunc	

The George language commands

Here is the complete list of George commands :

tv_airbrush	tv_getpixel	tv_panning	tv_spareswap
tv_alphaloadmode	tv_getpixeldisplay	tv_penbrush	tv_sparetoback
tv_alphasavemode	tv_getpixellayer	tv_pencil	tv_sparetofront
tv_areadraw	tv_getprojectname	tv_perswrap	tv_specialbrush
tv_areainit	tv_getuser	tv_piccolor	tv_speed
tv_areamove	tv_getwidth	tv_preserve	tv_stacksavebin
tv_tvpaint2back	tv_ghostline	tv_propelling	tv_stacksave
tv_tvpaint2front	tv_grab	tv_projectclose	tv_stackloadbin
tv_background	tv_imagefromclipboard	tv_projectcurrentid	tv_stackload
tv_blend	tv_imagetoclipboard	tv_projectduplicate	tv_stackexecutebin
tv_bookmarksenum	tv_lastimage	tv_projectenumid	tv_stackexecute
tv_bookmarkset	tv_layeranim	tv_projectinfo	tv_stackopen
tv_bookmarkclear	tv_layercopy	tv_projectnew	tv_stackclose
tv_bookmarktoggle	tv_layercreate	tv_projectselect	tv_stackapply
tv_bookmarknext	tv_layercurrentid	tv_readprojectstring	tv_stackclear
tv_bookmarkprev	tv_layercut	tv_oilbrush	tv_startframe
tv_brushcut	tv_layerdensity	tv_quit	tv_strokepoint
tv_brushfromclipboard	tv_layerdisplay	tv_rangeclear	tv_strokesize
tv_brushinfo	tv_layerduplicate	tv_rangegrab	tv_tcmode
tv_brushpoly	tv_layerfetch	tv_rangenoise	tv_textbrush
tv_brushrestore	tv_layergetid	tv_rangeset	tv_texttool
tv_brushtoclipboard	tv_layergetimage	tv_ratio	tv_tornado
tv_bump	tv_layergetpos	tv_readuserstring	tv_undo
tv_circle	tv_layerhold	tv_readtextfile	tv_updateundo
tv_circlefill	tv_layerimage	tv_recorder	tv_unlockcacheflush
tv_clear	tv_layerinfo	tv_rect	tv_unlockdisplay
tv_colorfactory	tv_layerinsertimage	tv_rectfill	tv_unlockmouse
tv_crazyblur	tv_layerinvert	tv_redo	tv_version
tv_densitylinex	tv_layerkill	tv_reqangle	tv_vfgetfont
tv_densityliney	tv_layermerge	tv_reqfile	tv_vfstringsize
tv_densityx	tv_layermergeall	tv_reqfloat	tv_waitbutton
tv_densityy	tv_layermove	tv_reqnum	tv_warn
tv_display	tv_layerpaste	tv_reqstring	tv_warpbrush
tv_dot	tv_layerrename	tv_request	tv_wave
tv_ellipse	tv_layersselect	tv_resetdisplay	tv_wetbrush
tv_ellipsefill	tv_layersselectinfo	tv_resizepage	tv_writepixel
tv_fastline	tv_layersset	tv_savebrush	tv_writeuserstring
tv_fieldcopy	tv_layersshift	tv_savebrushanim	tv_writeprojectstring
tv_fielddouble	tv_layerstencil	tv_savedisplay	tv_zdot
tv_fileinfo	tv_layerstretch	tv_saveimage	tv_zline
tv_fill	tv_line	tv_savemode	tv_zspline
tv_filter	tv_listrequest	tv_savepalette	
tv_firstimage	tv_loadbrush	tv_saveproject	
tv_flipimagex	tv_loadbrushanim	tv_savesequenece	
tv_flipimagey	tv_loadimage	tv_selectshapetool	
tv_fixmotion	tv_loadpalette	tv_serialnumber	
tv_framerate	tv_loadproject	tv_setapen	
tv_gauge	tv_loadsequence	tv_setbpen	
tv_gblur	tv_loadspare	tv_setcolor	
tv_getactivetool	tv_lockcacheflush	tv_setpalette	
tv_getactiveshape	tv_lockdisplay	tv_shadow	
tv_getapen	tv_lockmouse	tv_smooth	
tv_getbpen	tv_magicnumber	tv_smoothdensity	
tv_getfield	tv_menuhide	tv_smoothedge	
tv_getheight	tv_menushow	tv_spareadddensity	
tv_getmouse	tv_mosaic	tv_sparecopy	
tv_getpalette	tv_noise	tv_sparekill	
tv_getpath	tv_nop	tv_sparesubdensity	

The main characteristics of the export formats :

You can export projects from TVPaint Animation Pro using several different file formats.

DIP, AVI, GIF, QUICKTIME, FLI, PNG, PCX, SUNRASTER, PSD, TGA, JPG, ILBM, TIFF, FLYER CLIP, D1 RTV, CINEON, SGI, SOFTIMAGE, BMP, VPB.

* The FLYER CLIP file format lets you export an animation that you can use with the VideoToaster Flyer from Newtek. The animation is saved as a single file and has usually a resolution of 752x480.

* You can use the D1 RTV file format in order to export an animation usable with the VideoToaster from Newtek . The animation is saved as a single file and has a resolution of 752x486 for NTSC and 720x576 for PAL

* The CINEON export format was created by the Eastman Kodak Compagny in order to be used with their scanners and recorders. It uses logarithmic datas (10 bits).

* The VPB format is native to the Quantel Video Paintbox. It uses 24 bits per pixels (more than 16 millions of colors). Although the VPB format use stencils and layers, TVPaint Animation Pro does not translate its layers into VPB layers at this time.

The other export formats are classified in the table below.

File format :	Export		Colors		Other options		
	Animation as single file	Image or Image sequence	8 bits : 256 colors	24 bits 16.777.216 colors	Save Opacity	Save Layers	Compression
TVP (AUR MIR)	✓	✓	-	✓	✓	✓	✗
DIP	✓	✓	-	✓	✓	✓	✗
AVI	✓	✗	-	✓	✗	✗	✓
GIF	✓	✓	✓	✗	une couleur transparente	✗	✓
QUICKTIME	✓	✗	-	✓	✗	✗	✓
FLI	✓	✓	✓	✗	✗	✗	✓
PNG	✗	✓	✓	✓	✓	✗	✓
PCX	✗	✓	-	✓	✗	✗	✗
SUNRASTER	✗	✓	-	✓	✓	✗	✗
PSD	✗	✓	-	✓	✓	✓	✗
TGA	✗	✓	-	✓	✓	✗	✓
JPG	✗	✓	-	✓	✗	✗	✓
BMP	✗	✓	-	✓	✓ in TVPaint	✗	✗
ILBM	✗	✓	-	✓	✗	✗	✗
TIFF	✗	✓	-	✓	✓	✗	✓
SGI	✗	✓	-	✓	✓	✗	✓
SOFTIMAGE	✗	✓	-	✓	✓	✗	✗



= Disponible / possible pour ce format de fichier



= Non disponible ou non recommandé pour ce format de fichier

The available keyboard shortcuts and commands

[Commands]

0	=	Tools: Right Mouse Button	67	=	Interface: Close Guides Panel
1	=	Undo: Multi Redo	68	=	Interface: Toggle Grid Panel
2	=	Undo: Last Action	69	=	Interface: Open Grid Panel
3	=	Color: Pick	70	=	Interface: Close Grid Panel
4	=	Color: Pick B Color	71	=	Interface: Open Video Grabber Panel
5	=	TVPaint Animation: Magic Number	72	=	Interface: Open Preview Settings Panel
6	=	TVPaint Animation: Help	73	=	Interface: Open Preferences Panel
7	=	Image Buffer: Hold	74	=	Interface: Open Display Panel
8	=	Image Buffer: Fetch	75	=	Interface: Open Shape Settings Panel
9	=	Spare: Copy To	76	=	Interface: Open Path Manager Panel
10	=	Spare: Exchange	77	=	Interface: Open Pixel Tracker Panel
11	=	Clipboard: Save Image	78	=	Interface: Open Path Recorder Panel
12	=	Clipboard: Load Image	79	=	Interface: Open Connection Panel
13	=	Clipboard: Save Brush	80	=	Interface: Open Custom Panel
14	=	Clipboard: Load Brush	81	=	File Project: Resize
15	=	File Project: New	82	=	Interface: Configure Keyboard
16	=	File Project: Load	83	=	TVPaint Animation: About
17	=	File Project: Save	84	=	Interface: Close Window
18	=	File Project: Save As	85	=	Interface: Next Cursor
19	=	File Project: Close	86	=	Layer: Pick Layer
20	=	TVPaint Animation: Quit	87	=	Layer: Merge Display
21	=	TVPaint Animation: No Border	88	=	Layer: Merge visible
22	=	TVPaint Animation: Iconify	89	=	Layer: Merge Selected
23	=	Printer: Config	90	=	Layer: Make Anim
24	=	Printer: Print	91	=	Layer: Rename
25	=	Twain: Acquire	92	=	Layer: Select All
26	=	File Import: Sequence	93	=	Layer: Select Image From Keys
27	=	File Import: Brush	94	=	Layer: Delete
28	=	File Export: Sequence	95	=	Layer: Duplicate
29	=	File Export: Brush	96	=	Layer: New
30	=	Interface: Open Main Panel	97	=	Layer: New Layer From Selected Images
31	=	Interface: Open Menu Panel	98	=	Layer: Insert Single Image Before Current Image
32	=	Interface: Toggle Tools Panel	99	=	Layer: Insert Single Image After Current Image
33	=	Interface: Open Tools Panel	100	=	Layer: Duplicate Single Image
34	=	Interface: Close Tools Panel	101	=	Layer: Insert Images Before Current Image
35	=	Interface: Toggle FX Panel	102	=	Layer: Insert Images After Current Image
36	=	Interface: Open FX Panel	103	=	Layer: Duplicate Image
37	=	Interface: Close FX Panel	104	=	Project: Insert Images
38	=	Interface: Open Time Line Panel	105	=	Project: Append Images
39	=	Interface: Open XSheet Panel	106	=	Project: Duplicate Image
40	=	Interface: Open Project Panel	107	=	Project: Insert Single Image
41	=	Interface: Toggle LightTable Panel	108	=	Project: Append Single Image
42	=	Interface: Open LightTable Panel	109	=	Project: Duplicate Single Image
43	=	Interface: Close LightTable Panel	110	=	Project: Hide Other
44	=	Interface: Toggle Palette Panel	111	=	Project: Show All
45	=	Interface: Open Palette Panel	112	=	Project: Hide
46	=	Interface: Close Palette Panel	113	=	Project: Show
47	=	Interface: Toggle Layer Panel	114	=	Layer: Insert Tween Image
48	=	Interface: Open Layer Panel	115	=	Layer: Insert Tween Images
49	=	Interface: Close Layer Panel	116	=	Layer: Retime
50	=	Interface: Toggle Navigator Panel	117	=	Project: Split
51	=	Interface: Open Navigator Panel	118	=	Project: Duplicate
52	=	Interface: Close Navigator Panel	119	=	Layer: Select All Images
53	=	Interface: Toggle Remote Panel	120	=	Layer: Delete Image
54	=	Interface: Open Remote Panel	121	=	Project: Delete Image
55	=	Interface: Close Remote Panel	122	=	Project: Previous
56	=	Interface: Toggle Gradient Panel	123	=	Project: Next
57	=	Interface: Open Gradient Panel	124	=	Layer: First Layer
58	=	Interface: Close Gradient Panel	125	=	Layer: Last Layer
59	=	Interface: Toggle Coordinates Panel	126	=	Layer: Previous Layer
60	=	Interface: Open Coordinates Panel	127	=	Layer: Next Layer
61	=	Interface: Close Coordinates Panel	128	=	Layer: First Layer with Selection
62	=	Interface: Toggle Paper Panel	129	=	Layer: Last Layer with Selection
63	=	Interface: Open Paper Panel	130	=	Layer: Previous Layer with Selection
64	=	Interface: Close Paper Panel			
65	=	Interface: Toggle Guides Panel			
66	=	Interface: Open Guides Panel			

131	=	Layer: Next Layer with Selection	203	=	Zoom: Rotation Reset
132	=	Layer: Move Layer Up	204	=	Zoom: Rotate +15 (counter clockwise)
133	=	Layer: Move Layer Down	205	=	Zoom: Rotate -15 (clockwise)
134	=	Layer: First Image	206	=	Zoom: Shake
135	=	Layer: Last Image	207	=	Zoom: Show full page
136	=	Layer: Next Image	208	=	Interface: Full Screen
137	=	Layer: Prev Image	209	=	Zoom: Scroll Up
138	=	Layer: First Image with Selection	210	=	Zoom: Scroll Up Left
139	=	Layer: Last Image with Selection	211	=	Zoom: Scroll Left
140	=	Layer: Next Image with Selection	212	=	Zoom: Scroll Down Left
141	=	Layer: Prev Image with Selection	213	=	Zoom: Scroll Down
142	=	Layer: Next Key	214	=	Zoom: Scroll Down Right
143	=	Layer: Prev Key	215	=	Zoom: Scroll Right
144	=	Layer: Next Key with Selection	216	=	Zoom: Scroll Up Right
145	=	Layer: Prev Key with Selection	217	=	Interface: Toggle windows display
146	=	Layer: Create Key	218	=	Zoom: Next Zoom window
147	=	Layer: Delete Key	219	=	Zoom: Prev Zoom window
148	=	Layer: Toggle Auto Key	220	=	Tools: Draw Dot
149	=	Layer: Select All Keys	221	=	Tools: Toggle Stencil
150	=	Layer: Toggle Display All	222	=	Tools: Toggle Paper
151	=	Layer: Toggle Stencil	223	=	Tools: Toggle Transparency
152	=	Layer: Invert Stencil	224	=	Tools: Toggle Red
153	=	Layer: Show All	225	=	Tools: Toggle Green
154	=	Layer: Hide All	226	=	Tools: Toggle Blue
155	=	Layer: Clear All Stencil	227	=	Tools Brush: Increase Size
156	=	Layer: Invert All Stencil	228	=	Tools Brush: Increase Size 2
157	=	Image: Flip Horizontally	229	=	Tools Brush: Decrease Size
158	=	Image: Flip Vertically	230	=	Tools Brush: Decrease Size 2
159	=	Image: Flip Both Axis	231	=	Tools Brush: Change size
160	=	Layer: Time Zoom In	232	=	Tools Brush: reset
161	=	Layer: Time Zoom Out	233	=	Layer: Clear
162	=	Layer: Light Table Mode	234	=	Tools Mode: Next
163	=	Layer: Toggle Frames/Time Code	235	=	Tools Mode: Prev
164	=	Layer: Toggle Background Mode	236	=	Tools Mode: Default
165	=	Layer: Background Mode None	237	=	Drawing Mode: 01 (Color)
166	=	Layer: Background Mode Color	238	=	Drawing Mode: 02 (Behind)
167	=	Layer: Background Mode Check	239	=	Drawing Mode: 03 (Erase)
168	=	Preview: Play	240	=	Drawing Mode: 04 (Panto)
169	=	Preview: Flip Book	241	=	Drawing Mode: 05 (Merge)
170	=	Preview: Flip Previous Frame	242	=	Drawing Mode: 06 (Shade)
171	=	Layer Sound: Load	243	=	Drawing Mode: 07 (Light)
172	=	Layer Sound: Delete	244	=	Drawing Mode: 08 (Colorize)
173	=	Layer: Fit To Project	245	=	Drawing Mode: 09 (Tint)
174	=	Layer: Fit To Selection	246	=	Drawing Mode: 10 (Grain)
175	=	Layer: Fit To Layer	247	=	Drawing Mode: 11 (Smooth)
176	=	Layer: Fit To Key	248	=	Drawing Mode: 12 (Noise)
177	=	Layer: Fit To Sound	249	=	Drawing Mode: 13 (Negative)
178	=	Layer: Fit To Frame	250	=	Drawing Mode: 14 (Sharp)
179	=	Layer: Reverse Selection	251	=	Drawing Mode: 15 (Emboss)
180	=	Layer: Split	252	=	Drawing Mode: 16 (Solarize)
181	=	Layer: Join Selected Layers	253	=	Drawing Mode: 17 (Saturate)
182	=	Layer: Link	254	=	Drawing Mode: 18 (UnSaturate)
183	=	Layer: Align Left	255	=	Drawing Mode: 19 (Add)
184	=	Layer: Align Right	256	=	Drawing Mode: 20 (Sub)
185	=	Layer: Slide	257	=	Drawing Mode: 21 (Multiply)
186	=	Layer: Slide To	258	=	Drawing Mode: 22 (Screen)
187	=	Layer: Goto Image	259	=	Tools Brush: Air
188	=	Layer: Expand / Collapse	260	=	Tools Brush: Pen
189	=	Layer: Select Current Image	261	=	Tools Brush: Oil Paint
190	=	Layer: Select Current Layer	262	=	Tools Brush: Water Color
191	=	FX Stack: Apply	263	=	Tools Brush: Propelling
192	=	FX Stack: Reset All	264	=	Tools Brush: Pencil
193	=	FX Stack: Delete All	265	=	Tools Brush: Warp
194	=	Zoom: New Zoom window	266	=	Tools Brush: Special
195	=	Zoom: Toggle Aspect	267	=	Tools Brush: Text
196	=	Zoom: Toggle Video	268	=	Tools Brush: CustomBrush
197	=	Zoom: Center	269	=	Tools Brush: Previous
198	=	Zoom: In	270	=	Tools Brush: Next
199	=	Zoom: Out	271	=	Tools Brush: Toggle Display
200	=	Zoom: Fit	272	=	Brush: Toggle CutBrush
201	=	Zoom: Fit Project Panel	273	=	Brush: Cut Rectangle
202	=	Zoom: 100%	274	=	Brush: Cut Magic Wand

275	=	Brush: Cut Poly	347	=	Color: Red +
276	=	Brush: Cut Freehand	348	=	Color: Green -
277	=	Brush: Double Size	349	=	Color: Green +
278	=	Brush: Halve Size	350	=	Color: Blue -
279	=	Brush: Toggle Handle Corner	351	=	Color: Blue +
280	=	Brush: Move Handle Corner	352	=	Gradient: Next
281	=	Brush: Outline	353	=	Gradient: Previous
282	=	Brush: Double Width	354	=	Gradient: Load
283	=	Brush: Double Height	355	=	Gradient: Save
284	=	Brush: Halve Height	356	=	Gradient: Default
285	=	Brush: Halve Width	357	=	Gradient: Invert
286	=	Brush: Flip Horizontally	358	=	Grid: Toggle
287	=	Brush: Flip Vertically	359	=	Grid: Snap
288	=	Brush: Rotate 90°	360	=	Grid: Display
289	=	Brush: Rotate -90°	361	=	Guides : Toggle
290	=	Brush: Rotate	362	=	Guides : Snap
291	=	Brush: Resize	363	=	Guides : Display
292	=	Brush: Optimize	364	=	Guides : Add
293	=	Brush: Optimize Source	365	=	Guides : Remove
294	=	Brush: Toggle Transparency	366	=	Display: Show SafeArea
295	=	Brush: Next Animbrush	367	=	Display: Show FieldChart
296	=	Brush: Previous Animbrush	368	=	Display: Show Stencil
297	=	Brush: Toggle Stamp/Brush	369	=	Display: Show Selection
298	=	Shape: Apply	370	=	Display: Show Paper
299	=	Shape: Freehand Dot	371	=	Grab : Video Input
300	=	Shape: Single Dot	372	=	Grab : Switch Modes
301	=	Shape: Freehand	373	=	Grab : Grab Length
302	=	Shape: Freehand Fill	374	=	Grab : Increase Grab Length
303	=	Shape: Circle	375	=	Grab : Decrease Grab Length
304	=	Shape: Circle Fill	376	=	BookMarks: Set
305	=	Shape: Line	377	=	BookMarks: Clear
306	=	Shape: Poly Fill	378	=	BookMarks: Toggle
307	=	Shape: Flood Fill	379	=	BookMarks: Next
308	=	Shape: Spline	380	=	BookMarks: Previous
309	=	Shape: Spline Fill			
310	=	Shape: Rectangle			
311	=	Shape: Rectangle Fill			
312	=	Shape Select: FreeHand			
313	=	Shape Select: Rectangle			
314	=	Shape Select: Ellipse			
315	=	Shape Select: MagicWand			
316	=	Shape Select: Spline			
317	=	Shape Select: Clear			
318	=	Shape Select: Invert			
319	=	Shape Select: Copy To CustomBrush			
320	=	Shape Select: Cut To CustomBrush			
321	=	Shape Select: Copy To New Layer			
322	=	Shape Select: Cut To New Layer			
323	=	Shape Transform: Pan			
324	=	Shape Transform: Position			
325	=	Shape Transform: Warp			
326	=	Tools Pantograph: Set			
327	=	Tools Healing: Set			
328	=	Tools: Crop			
329	=	Tools: Zoom			
330	=	TVPaint Animation: Copy Selection			
331	=	TVPaint Animation: Paste			
332	=	TVPaint Animation: Cut Selection			
333	=	TVPaint Animation: Select All			
334	=	TVPaint Animation: Delete Selection			
335	=	Color: Up			
336	=	Color: Down			
337	=	Color: Right			
338	=	Color: Left			
339	=	Color: Invert A/B			
340	=	Color: Hue <<			
341	=	Color: Hue >>			
342	=	Color: Saturation -			
343	=	Color: Saturation +			
344	=	Color: Luminosity -			
345	=	Color: Luminosity +			
346	=	Color: Red -			

[Shortcuts]

a	=	Zoom: Shake	ctrl v	=	TVPaint Animation: Paste
b	=	Brush: Toggle CutBrush	ctrl w	=	none
c	=	Brush: Rotate	ctrl x	=	TVPaint Animation: Cut
d	=	Shape: Freehand	Selection		
e	=	Tools Brush: Next	ctrl y	=	Brush: Flip Vertically
f	=	Shape: Flood Fill	ctrl z	=	Undo: Last Action
g	=	Grid: Toggle	0	=	Interface: Toggle Layer Panel
h	=	Brush: Halve Size	1	=	Zoom: Scroll Down Left
i	=	Project: Append Images	2	=	Zoom: Scroll Down
j	=	Spare: Exchange	3	=	Zoom: Scroll Down Right
k	=	none	4	=	Zoom: Scroll Left
l	=	Shape: Line	5	=	Zoom: Center
m	=	Zoom: New Zoom window	6	=	Zoom: Scroll Right
n	=	Color: Invert A/B	7	=	Zoom: Scroll Up Left
o	=	Brush: Outline	8	=	Zoom: Scroll Up
p	=	Interface: Toggle Palette Panel	9	=	Zoom: Scroll Up Right
q	=	Shape: Spline	ctrl pad 0	=	none
r	=	Shape: Rectangle	ctrl pad 1	=	Interface: Open Time Line Panel
s	=	Shape: Freehand Dot	ctrl pad 2	=	Interface: Open XSheet Panel
t	=	Tools Brush: Text	ctrl pad 3	=	Interface: Open Project Panel
u	=	Undo: Last Action	ctrl pad 4	=	none
v	=	Interface: Full Screen	ctrl pad 5	=	none
w	=	Preview: Flip Book	ctrl pad 6	=	none
x	=	Brush: Flip Horizontally	ctrl pad 7	=	none
y	=	Brush: Flip Vertically	ctrl pad 8	=	none
z	=	Brush: Resize	ctrl pad 9	=	none
shift a	=	Interface: Toggle Tools Panel	/	=	Tools Brush: Decrease Size 2
shift b	=	Layer: Toggle Background Mode	*	=	Tools Brush: Increase Size 2
shift c	=	Tools Healing: Set	-	=	Tools Brush: Decrease Size
shift d	=	Interface: Open Preferences Panel	+	=	Tools Brush: Increase Size
shift e	=	none	,	=	Layer: Pick Layer
shift f	=	Layer: Goto Image	;	=	Color: Pick
shift g	=	Interface: Open Grid Panel	:	=	Tools Brush: reset
shift h	=	Brush: Double Size	!	=	none
shift i	=	Project: Insert Images	<	=	Zoom: Out
shift j	=	Spare: Copy To	>	=	Zoom: In
shift k	=	Layer: Clear	&	=	none
shift l	=	File Project: Load	~	=	none
shift m	=	none	"	=	none
shift n	=	File Project: New	#	=	none
shift o	=	Brush: Toggle Handle Corner	'	=	none
shift p	=	Tools Pantograph: Set	(=	none
shift q	=	TVPaint Animation: Quit	braquet	=	Image: Flip Horizontally
shift r	=	none		=	Interface: Toggle Coordinates Panel
shift s	=	File Project: Save	`	=	none
shift t	=	none	~	=	none
shift u	=	Undo: Multi Redo	\	=	none
shift v	=	Zoom: Show full page	@	=	none
shift w	=	File Project: Close)	=	none
shift x	=	Brush: Double Width]	=	Image: Flip Vertically
shift y	=	Undo: Multi Redo	}	=	none
shift z	=	Brush: Rotate 90°	\$	=	none
ctrl a	=	TVPaint Animation: Select All	£	=	none
ctrl b	=	none	%	=	none
ctrl c	=	TVPaint Animation: Copy Selection	\$	=	none
ctrl d	=	TVPaint Animation: Magic Number	.	=	none
ctrl e	=	Tools Brush: Previous	equal	=	Layer: Toggle Display All
ctrl f	=	Layer: Slide To	^	=	none
ctrl g	=	none	..	=	none
ctrl j	=	none	μ	=	none
ctrl k	=	Interface: Configure Keyboard	α	=	none
ctrl l	=	Layer: Light Table Mode	²	=	none
ctrl n	=	Layer: New	f1	=	TVPaint Animation: Help
ctrl o	=	Project: Hide Other	f2	=	Drawing Mode: 01 (Color)
ctrl p	=	Project: Show All	f3	=	Drawing Mode: 02 (Behind)
ctrl q	=	none	f4	=	Drawing Mode: 03 (Erase)
ctrl r	=	none	f5	=	Drawing Mode: 04 (Panto)
ctrl s	=	Layer: Select Image From Keys	f6	=	Drawing Mode: 05 (Merge)
ctrl t	=	= none	f7	=	Drawing Mode: 06 (Shade)
ctrl u	=	= none			

f8	=	Drawing Mode: 07 (Light)	end	=	Layer: Last Image
f9	=	Drawing Mode: 08 (Colorize)	ctrl end	=	Layer: Last Layer
f11	=	Zoom: Show full page	shift end	=	none
f12	=	Interface: Toggle windows display	ctrl shift end	=	none
ctrl f1	=	none	del	=	TVPaint Animation: Delete Selection
ctrl f2	=	none	shift del	=	TVPaint Animation: Delete Selection
ctrl f3	=	none	ctrl del	=	none
ctrl f4	=	Interface: Close Window	ctrl shift del	=	none
ctrl f5	=	none	insert	=	Zoom: Rotation Reset
ctrl f6	=	none	shift insert	=	none
ctrl f7	=	none	ctrl insert	=	none
ctrl f8	=	none	ctrl shift insert	=	none
ctrl f9	=	TVPaint Animation: Iconify	backspace	=	Layer: Clear
ctrl f11	=	TVPaint Animation: No Border	shift backspace	=	Shape Select: Clear
ctrl f12	=	none	up	=	Layer: Previous Layer
shift f1	=	none	shift up	=	Layer: Previous Layer with Selection
shift f2	=	none	ctrl up	=	Layer: Move Layer Up
shift f3	=	none	ctrl shift up	=	BookMarks: Toggle
shift f4	=	none	down	=	Layer: Next Layer
shift f5	=	none	shift down	=	Layer: Next Layer with Selection
shift f6	=	none	ctrl down	=	Layer: Move Layer Down
shift f7	=	none	ctrl shift down	=	Color: Down
shift f8	=	none	left	=	Layer: Prev Image
shift f9	=	none	shift left	=	Layer: Prev Image with Selection
shift f11	=	none	ctrl left	=	Brush: Previous Animbrush
shift f12	=	none	ctrl shift left	=	BookMarks: Previous
ctrl shift f1	=	none	right	=	Layer: Next Image
ctrl shift f2	=	none	shift right	=	Layer: Next Image with Selection
ctrl shift f3	=	none	ctrl right	=	Brush: Next Animbrush
ctrl shift f4	=	none	ctrl shift right	=	BookMarks: Next
ctrl shift f5	=	none	page up	=	Layer: Prev Key
ctrl shift f6	=	none	shift page up	=	Zoom: Rotate +15 (counter clockwise)
ctrl shift f7	=	none	ctrl page up	=	none
ctrl shift f8	=	none	ctrl shift page up	=	none
ctrl shift f9	=	none	page down	=	Layer: Next Key
ctrl shift f11	=	none	shift page down	=	Zoom: Rotate -15 (clockwise)
ctrl shift f12	=	none	ctrl page down	=	none
space	=	Tools: Right Mouse Button	ctrl shift page down	=	none
tab	=	Project: Next	mmb	=	none
shift tab	=	Project: Previous	shift mmb	=	none
ctrl tab	=	Zoom: Next Zoom window	ctrl mmb	=	none
ctrl shift tab	=	Zoom: Prev Zoom window	ctrl shift mmb	=	none
home	=	Layer: First Image			
shift home	=	none			
ctrl home	=	Layer: First Layer			
ctrl shift home	=	none			

The initialization file (PC only)

As a lot of software nowadays, TVPaint Animation Pro use an initialization file in ASCII format. This file contains a lot of parameters. Its name is **TVPaint Animation Pro.ini** and is located in the directory :

C:\windows\system on *Microsoft Windows XP*

C:\WINNT\SystemRoot on *Microsoft Windows 2000*

It is possible to edit this file with any text editor like Notepad from Microsoft Windows
Here is the content of the file *TVPaint Animation Pro.ini* , by default :

```
[STARTUP]
Last_Config=
Homedir=C:\Program Files\TVPaint Developpement\TVPaint Animation Pro
Georgedir=C:\Program Files\TVPaint Developpement\TVPaint Animation Pro\George\
Temp=D:\temp\TVPAP\
locfile=french.tvpaint.loc
language=french
```



It is possible to add comments after each line of this file. You only need to add the character « ; » before writing it. For instance :

language=english ; we will use the english language.

Here are the options that you can add and/or modify in this file :

HomeDir

This option indicates the directory containing the executable file of the software :
C:\Program Files\TVPaint Developpement\TVPaint Animation Pro in Microsoft Windows operating system

GeorgeDir

This option indicates the directory containing the George Script by default :
C:\Program Files\TVPaint Developpement\TVPaint Animation Pro\George
in Microsoft Windows operating system.

Temp

This option indicates the directory containing the temporary files of TVPaint Animation Pro. Although, you have chosen this directory during the install process of the software, you can change it here or you can use the **Prerences Panel** in the **Edit** main menu.

Last_Config

This option allows to know the last configuration file that you have used with TVPaint Animation Pro.

Nosubtablet

This option allows to fix calibration problems that are sometimes encountered with old models of graphic tablet. (it awaits the value 0 or 1).

[Gauge](#)



The line **Gauge = 0** suppress the progress bar during the rendering calculations.
 The line **Gauge = 1** displays the progress bar during the rendering calculations.

[PopX= PopY=](#)

When you use the software, some panels such as progress bar, export panels, etc ... use to popup at the center of the screen by default. (or at the center of your first screen if you have a dual screen configuration).

This option allows you to choose where you want them to appear. For instance, if you want those panels to appear at the bottom of your screen, you can use those settings :

PopX = 0

PopY = - 400

[ReqFileName](#)

Let's suppose that you have entered the line **ReqFileName = Yes** .Each time you will have to select a file, it will make the software to remember the path of the last saved file.
 Let's suppose that you have entered the line **ReqFileName = No** .This time, the software will not remember the path of the last saved file when using a requester.



DirectDraw is a DirectX library which allows to manage calculations and 2D graphics rendering. It allows to use the hardware acceleration of the graphic cards in order to display datas in real time.

[DdrawEmulationOnly](#)

On a few graphic cards, all the DirectDraw functions are not supported. In this case, it is necessary to unactivate the use of DirectDraw by writing the line :

DdrawEmulationOnly = 1

(The line **DdrawEmulationOnly = 0** have the reverse effect)

[DDrawRgbaOnly](#)

By default, the DirectDraw functions works with YUVA channels.

If you want them to work with RVBA channels, add the line :

DdrawRgbaOnly = 1

The line **DdrawRgbaOnly = 0** gives the same result as the default setting.

[Language](#)

This option allows to select the user interface language :

The line **language = french** will make you use the french interface

The line **language = english** will make you use the english interface

[Locfile](#)

This option indicates the name of the file containing the translations of the user interface :

locfile = french.tvpaint.loc for the french interface

locfile = tvpaint.loc for the english interface

The technical support and internet resources

We did our best to provide you a detailed user-manual, with a lot of illustrated examples.

However, you may still have questions regarding the software.

You can find additionnal and helpful informations about the TVPaint technology on our website :

www.tvpaint.com

You will find :

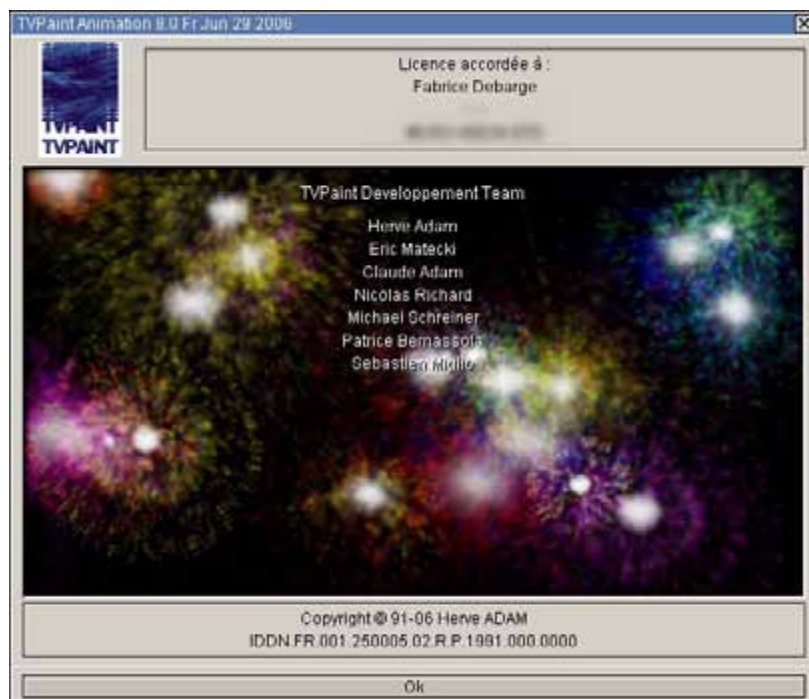
- * Lastest news, about the TVPaint Technology
- * Tutorials, palettes, custom brushes, papers, scripts and plug-in.
- * Some user-stories,
- * Lastest demos and updates For your current Software.
- * Discussion forums with a technical support in french, english and spanish language.
- * A gallery where hundreds of pictures and animations will show you the possibilities given by the TVPaint solutions from its creation.



It's the share place ! The TVPaint forums gather the discussion of our users, samples of their works as well as brushes, scripts and tips for the benefit of all. Feel free to post your own productions and to share your techniques !
Join the TVPaint users Community !

When contacting us via email, forum, phone, ... please don't forget to give us the following informations :

- * Your computer (PC, Macintosh, ...), its CPU (AMD, Intel, ...), it's amount of RAM
- * Your operating system (apple OS-X, Microsoft windows, ...)
- * The version of TVPaint animation Pro that you are running : you can find it in the about section of the software (see below)
- * Your video hardware, if you have one.



Here are our full coordinates :

TVPAINT DEVELOPPEMENT
Route de Marange
57280 Maizieres les Metz
FRANCE

Phone : +33 (0)387 173 598
Fax : +33 (0)387 173 599
Email : tvpaint@tvpaint.fr

TVPaint Developpement is located at
Maizieres Les Metz, 10 km away from Metz.
Transporation means for meeting us are :



Planes :

Metz / Nancy Lorraine Airport - 40 Km
<http://www.metz-nancy-lorraine.aeroport.fr/>
Luxembourg Findel Aiport - 55 Km
<http://www.luxair.lu/fr/airport/>

Trains :

Metz Railway Station
Booking / Information SNCF :
Phone : +33 (0)8 92.35.35.35
<http://www.sncf.com>

Metz Taxi :

Phone : +33 (0)3 87.56.91.92

Car :

Autoroute A31, Exit n35
For a custom itinary :
<http://www.viamichelin.com>

